

SEPTEMBER

1937

MEMBER



Rock Products

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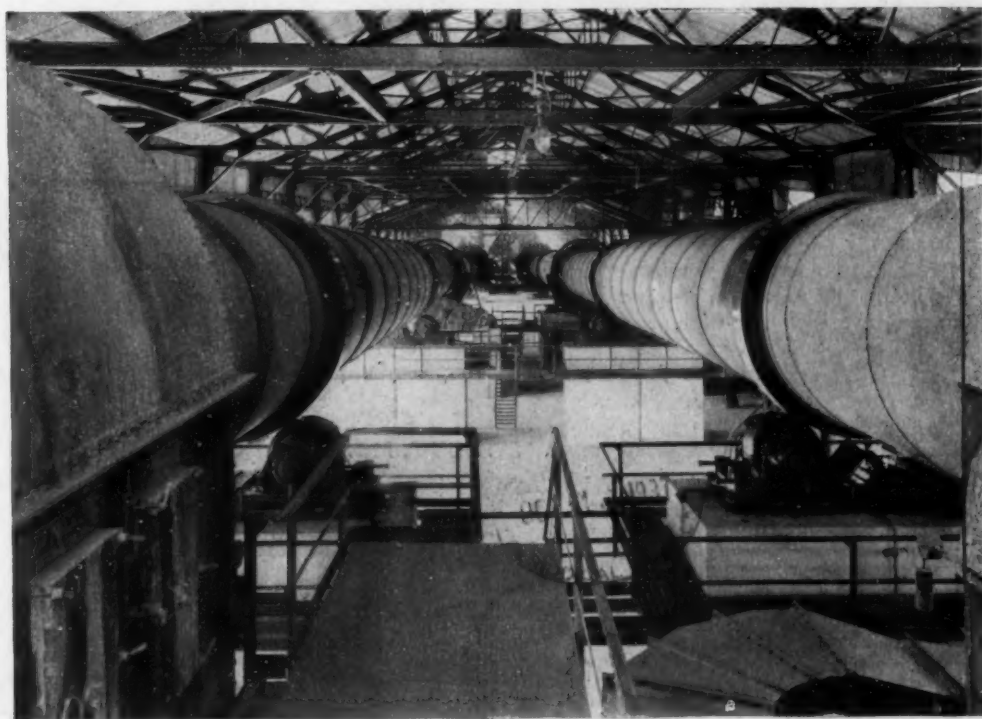
CEMENT and ENGINEERING **NEWS** (Est. 1896)

CONCRETE
PRODUCTS (Est. 1918)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

ROTARY KILNS

With integral Coolers, such as the UNAX cooler or the UNAX GRATE cooler



CEMENT MAKING MACHINERY
CEMENT PLANT ENGINEERING

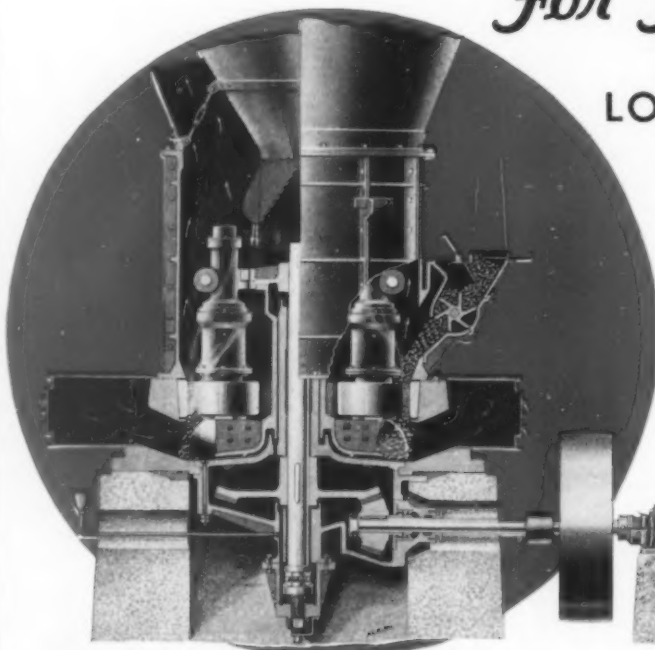
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the WILLIAMS IMPROVED ROLLER MILL with AIR SEPARATION

For Fine Grinding—



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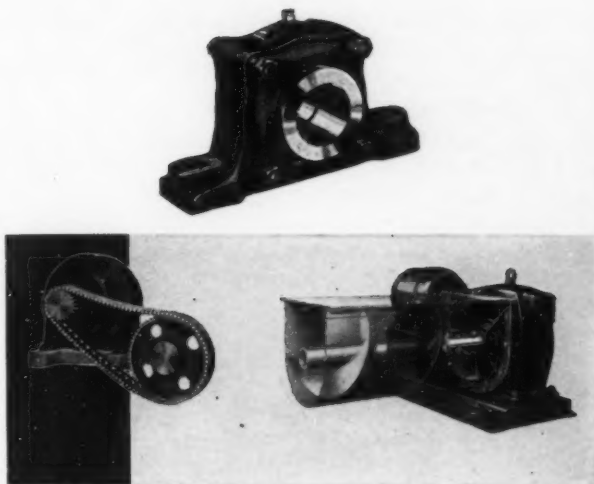


Williams Roller Mill
with Super Separator

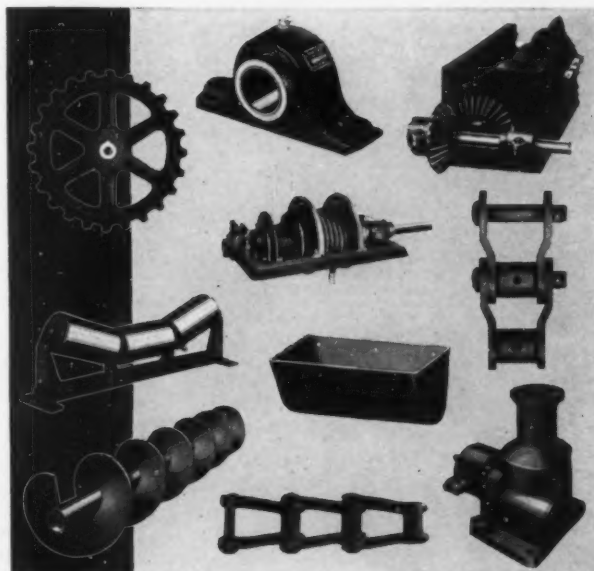


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PATENT CRUSHERS GRINDERS SHREDDERS



WHAT "BUILT *by* LINK-BELT"

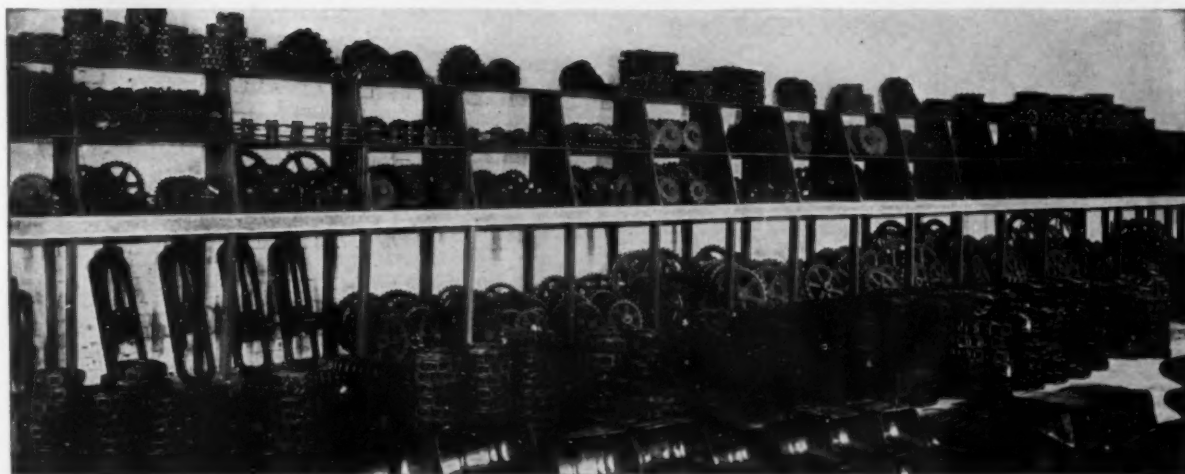


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ATLANTA SAN FRANCISCO TORONTO
Offices in Principal Cities



Rock Products

Which is consolidated with the journals

CEMENT and ENGINEERING CONCRETE and NEWS PRODUCTS

Founded 1896

Est. 1918

Entered as second-class matter, Jan. 30, 1936, at the
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RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

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Telephone
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MACHINES THAT NEED RUBBER HEELS

A typical example of Goodrich development in rubber

THIS is the way machines used to look in an Ohio manufacturing plant. The huge press vibrated, and transmitted so much of its vibration to the floor that delicate grinding machines nearby were affected—every time the press plunged down, the grinders jumped so that their product could not be made to the .0006-inch tolerance required. Everything was tried—even a special individual foundation for the press—but vibration still continued.

A Goodrich engineer had discovered a way to bond rubber inseparably to metal. Strengthening that bond to bear the weight of heavy industrial machin-

ery made possible the "Vibro-Insulator"—and shock and noise in industry were defeated.

Goodrich Vibro-Insulators are literally rubber feet for anything which vibrates. They consist of two pieces of metal—one attached to the machine, one to the floor—bonded together with rubber so that the machine virtually hangs in the air, partly suspended and partly resting on the rubber, which absorbs the vibration and so kills the shock and noise.

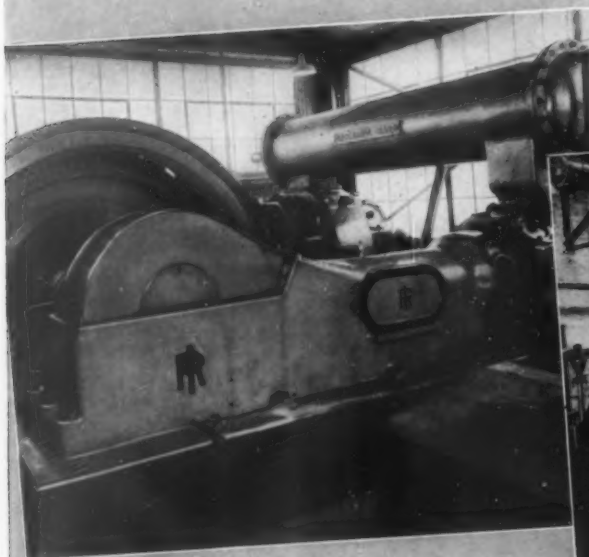
The manufacturer equipped his grinders with these Vibro-Insulators—and rejects were reduced to the vanishing point.

Hundreds of concerns have used this Goodrich development to increase accuracy of product, improve efficiency of workers, lengthen life of machines. But the important point—important to every plant in every industry—is that this development is typical of the constant research going on at Goodrich—research which develops new rubber compounds and new uses for them, to make every Goodrich product the best value money can buy. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

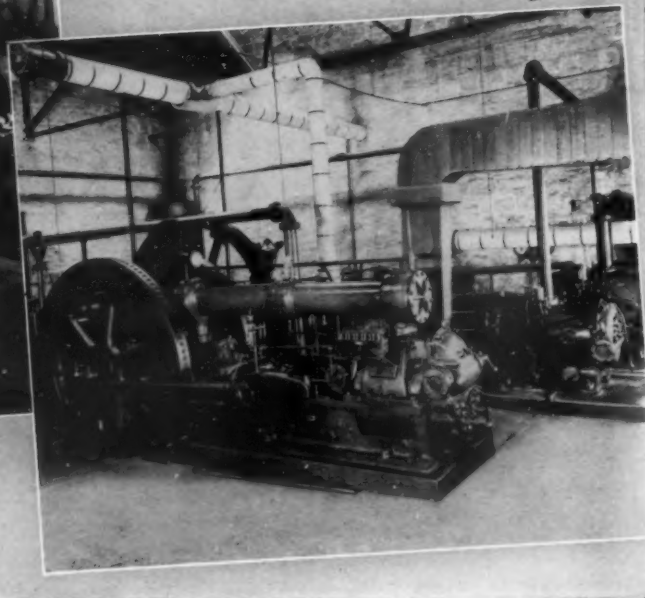
Goodrich
ALL products *problems* IN RUBBER

MORE AIR

... this way!



All the lubricants used by this big quarrying outfit are Texaco . . . for their Diesels, steam engines, gang saws, cranes . . . throughout the property. They report big benefits from the use of Texaco Lubricants.



You can get the same long, continuous performance from your compressors and air drills that the North Carolina Granite Corporation gets . . . when you use the same lubricants . . . Texaco. This organization reports lowered maintenance cost, lowered cost of lubrication . . . over a period of more than five years.

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All of the air drills here are operating on Texaco Lubricants. Deeper holes, and more of them per day, is the yardstick for measuring the quality of the oil in air drills.



TEXACO Compressor Lubricants

Immediate Steel



Accurately Sheared Sheets



Intricate parts are quickly flame cut from heavy plates.

Ryerson Abrasion Resisting Steel Sheets and Plates

Sheets and plates of a steel developed expressly for abrasion resistance. They last many times longer than ordinary steel yet are moderate in price. We can furnish them plain, or bent, perforated, punched or formed to your specifications. Write for bulletin giving complete data.

Perforated Sheets and Plates

We are prepared to furnish sheets and plates with all standard types of perforations. Two types are regularly carried in stock. See the Ryerson Stock List.

Other Steel Products

Ryerson stocks include practically everything in steel and allied lines.

Cold Finished Shafting
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Rails, Splices, Spikes, Bolts, Etc.

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Write for Stock List

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There are ten Ryerson plants ready to serve you. When you need steel a phone call, wire or letter will start it on the way to you at once.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cleveland, Cincinnati, Detroit, Boston, Buffalo, Philadelphia, Kansas City

RYERSON



STEEL CONVERSION IS A REGULAR PART OF **TIMKEN ROCK BIT SERVICE**

Timken Authorized Conversion Shops make it easy for you to have any size and footage of round or hexagon steel converted quickly and economically.

Timken Authorized Conversion Shops are operated in conjunction with Timken Rock Bit Distributors. They are completely equipped with the special machines, dies and tools necessary for this work and employ only trained and experienced operators. Every shop is under the constant supervision of Timken conversion engineers thus assuring consistently high quality, uniform workmanship and low cost.

In addition to providing adequate facilities for the conversion of your existing steel, Timken Authorized Conversion Shops are prepared to furnish new steel for TIMKEN Bits—round or hexagon—in any diameter and footage.

There is a Timken Rock Bit Distributor and Authorized Conversion Shop at the other end of your telephone. Write for name and address.



HIAWATHA. Timken Bearing Equipped streamlined flyer of the Milwaukee Road

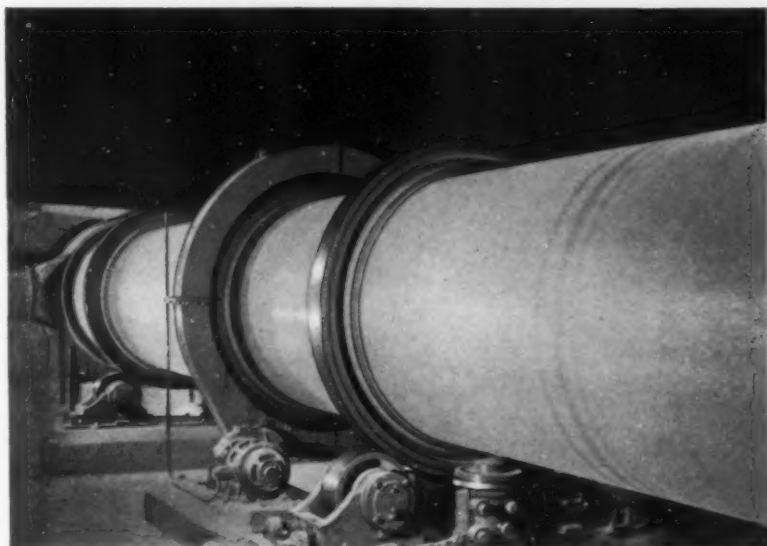
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN

ROCK BITS

TRAYLOR COOLERS



*will
cut
your
fuel
costs!*

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Scrubbers
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Ball Mills
Rod Mills
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Pug Mills
Wash Mills
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Rotary Screens
Elevators
Welded or Riveted
Stacks, Tanks and
Bins for any purpose.

"Going up"! Every one has heard that recently, so often that it has become monotonous—taxes, labor, materials—everything HAS gone up, and the end is not yet, since rising costs are the inevitable complement of "prosperity".

There is a way, however, for cement and lime manufacturers to beat one rise, and beat it badly—the cost of fuel,—by installing the Traylor-Cheesman Kiln-Cooler-Burner System, or the Cooler-Burner System in connection with an old kiln.

With the Cooler, all the heat of clinker, or other calcined materials, to at least within 100° of temperature, is recovered and all of these gases are used by the Burner as pre-heated (to about 900°F) combustion air in the kiln, comprising about 80% of the air used therein.

This results in a clear saving of fuel of at least 25%—distinctly worth while. You should, by all means, have our expert around to "talk it over." At least you should have our Bulletin 116—highly informative! Why not write us now?

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Fatigue machine

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for Macwhyte to
produce a tougher,
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● There are only a few of these machines in America. With this Haigh Robertson Fatigue Testing Machine, Macwhyte can measure quickly the resistance which the wire offers to repeated bending stresses. Constant experiments with this machine have helped Macwhyte to develop wire with a higher fatigue resistance. This operation is typical of Macwhyte's policy of producing only high quality wire. Constant research is one of the many reasons why Macwhyte PREformed Wire Rope gives such good service.



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designed for jobs
where ropes must
stand up under severe
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scrapers, loaders, mixers,
pavers, incline
hoists. Macwhyte
also makes specially
designed
non-preformed
ropes.



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Manufacturers of wire rope and braided wire rope slings
Distributors and stock throughout the U. S. A. for quick service



In November, 1936, the South Texas Brokerage Company, operators of an aggregate plant in Corpus Christi, bought two Rex 1½-Yard Moto-Mixers and stepped out after the ready-mixed concrete business in their vicinity.

And what happened? In their town—of 27,000 population—they found there was all the market they expected for cement and aggregates in the form of ready-mixed concrete—and more! It was so much greater in

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Time and again, as they did in Corpus Christi, Rex Moto-Mixers have led aggregate dealers to new highs in turnover—new peaks in profits. They'll do the same for you in *your* town in merchandising your sand, stone, cement and gravel the REX WAY.

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that licks the BIGGEST CRUSHING JOBS



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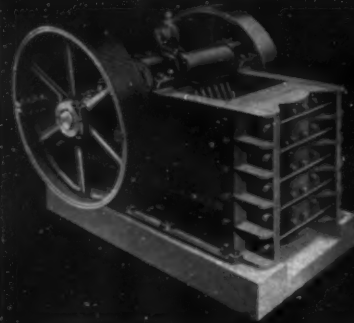
A massive box type open hearth steel casting—heat treated and thoroughly annealed—this swing jaw is built with interior ribs extending throughout its entire length and width.

The six removable manganese steel jaw plates can be interchanged to distribute wear. They are provided with accurately ground tongues which fit corresponding grooves on the machined face of the jaw—thereby preventing any side movement or shifting.

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Removable steel bushings for the swing jaw pin, allow easy replacement and prolong the life of the jaw indefinitely. An ingenious method of lubrication protects all moving parts.

Bulletin No. 110 will show you how other outstanding construction features of these all-steel crushers can help you increase your capacity and reduce crushing costs. Write today for your free copy.



C. G. BUCHANAN

Crushing Machinery Division of

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How many did you check? If more than five—any five—the chances are that "Flex-Set" Preformed Yellow Strand is your best buy.

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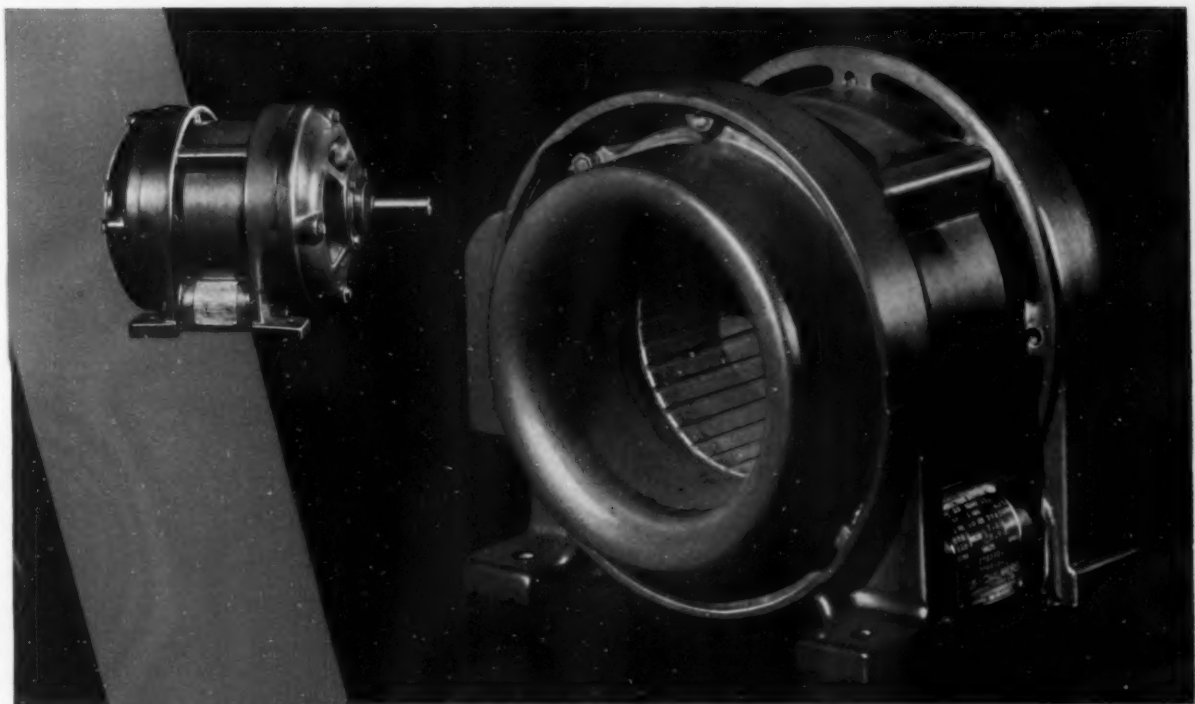
Items 2 and 3 above are specially important on equipment whose ropes are renewed more or less frequently. "Flex-Set" Preformed Yellow Strand costs less to install; can be speeded up under full load in less time; lasts longer. Try "Flex-Set" Preformed Yellow Strand on power shovels, for hoist line, crowd rope, rack rope; on dragline machines, for dragline and hoist line; on clamshell buckets, for holding line and closing line.

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ST. LOUIS

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Branches: New York—Chicago—Seattle—Portland—Houston

No. U-7R2

"Flex-Set" Preformed Yellow Strand



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But all the sturdiness of the sturdiest motor is of no avail if its vital parts are vulnerable.

Allis-Chalmers Seal-Clad Motors are invulnerable to the attacks of metallic dust, grit, oil, moisture, chemicals and other such destructive agents, one or more of which are present in every plant to a greater or lesser degree.

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The wound stator of this motor receives an impregnating treatment similar to that given the conventional type of winding . . . AND THEN a Moulded Bakelite Shield, of high dielectric and mechanical strength, is fitted into a machined slot in the stator frame and tightly sealed into position with a special compound. Thus the coils are protected by hard, smooth shields that are impervious to damaging agents.

For further details, write today for Leaflet No. 2182.

The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 hp. up—also motors for special application.

MOTOR DIVISION

ALLIS-CHALMERS

MILWAUKEE WISCONSIN



SWING CLUTCHES

that don't
GRAB!



HERE is the most used and abused assembly on any shovel, crane or dragline!—the swing clutches.

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Mounted on a heavy alloy steel shaft rolling on ball bearings, they are the ultimate in smooth action and uniform pressure—no jerks, no grabs.

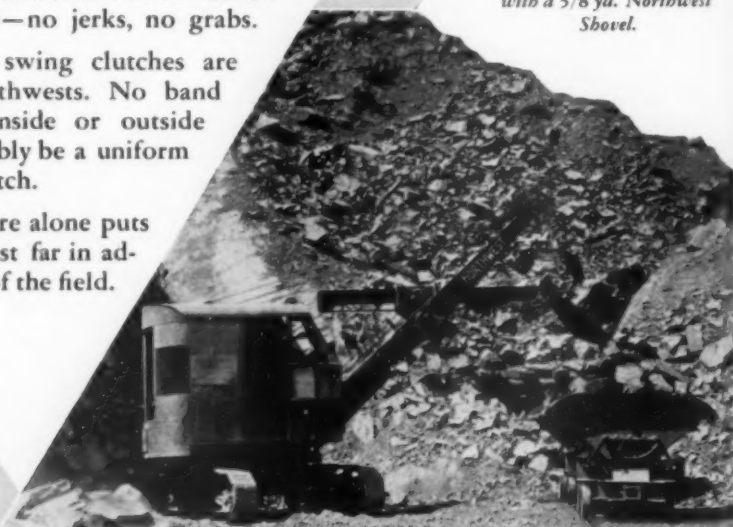
Uniform pressure swing clutches are used on all Northwests. No band clutch either inside or outside type can possibly be a uniform pressure clutch.

This feature alone puts Northwest far in advance of the field.

The smaller Northwests are "Rock Shovels" too—Handling quarry work with a 5/8 yd. Northwest Shovel.

NORTHWEST ENGINEERING COMPANY

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28 East Jackson Boulevard
Chicago Illinois



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THE WORLD'S LARGEST EXCLUSIVE BUILDERS OF
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Large Condor Sand Suction Hose—33" in diameter, 14' long, 12-ply

Bridge building in Louisiana . . . air drilling at T. V. A. . . coal mining in Pennsylvania . . . it's all the same to the men who use Condor Hose—a tough life made easier. Made easier because Condor Hose gives him less trouble for it needs no pampering, it takes the punishment of severe service and sticks to the job.

For real hose performance and economy, as well as for the sake of the men who use the hose, specify Condor.

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For heavy rough service—mines, quarries, etc., where hose is subject to external abuse, irregular pressures, and hardships natural to drilling.

CONDOR WATER HOSE

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CONDOR STEAM HOSE

For continuous heavy-duty work. Resists heat and over-vulcanization for the largest possible time.

CONDOR SUCTION HOSE

For heavy-duty sand suction and dredging service. Made to withstand severe abrasion and rough handling.

CONDOR HOSE



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Condor
PRODUCTS

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Transmission Belt	Contractors Hose	Rubber Covered Rolls
V-Belt	Sand Blast Hose	Chute Lining
Hydraulic Hose	Suction Hose	Lauder Lining
Steam Hose	Fire Hose	Industrial Brake Blocks
Water Hose	Molded Rubber Goods	Rubber Bonded
		Abrasive Wheels



THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

RESEARCH OFFICE AND FACTORY: NEW YORK, N. Y.

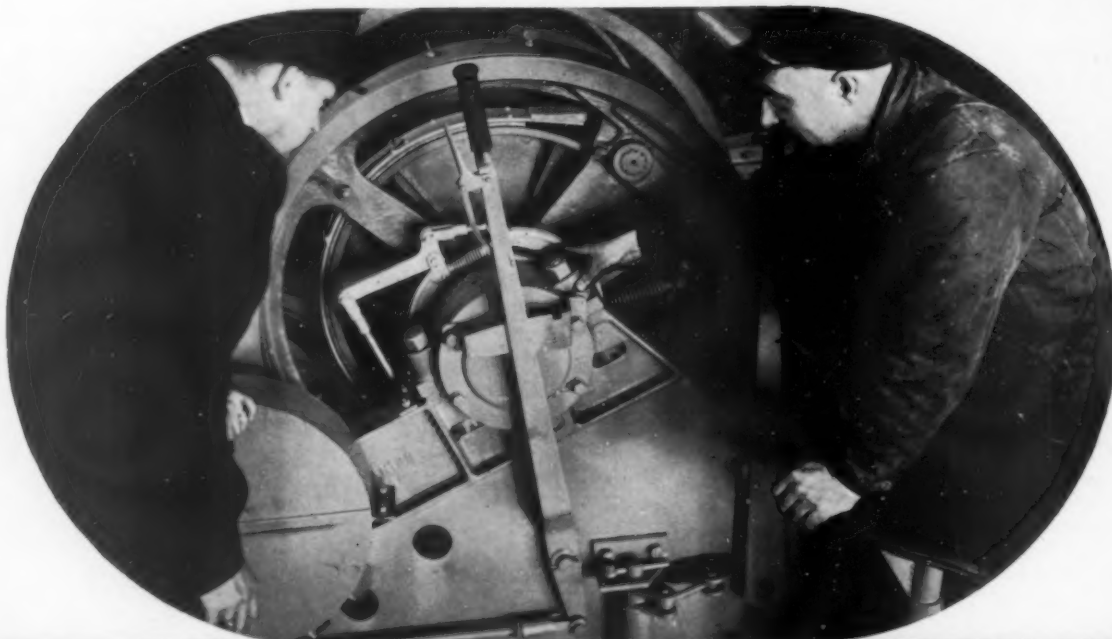


"I've run my P&H on all kinds of jobs, digging basements, stripping and loading materials, and never had to worry how tough the digging was. We always got big production."
—N. S. Carpenter.

**NO GRABBING
NO DRAGGING
NO CHATTERING**

WITH THESE

P&H SPLIT SECOND CLUTCHES



P&H Pacemakers-FASTER ON THE JOB

● These split-second clutches have full floating, full releasing shoes, perfectly equalized. They can't grab or drag. Bands can't wear unevenly. You can "feel" the clutch at all times. It takes only a few minutes and a few cents to replace brake linings. The first excavators to use this better type of clutch are the P&H Pacemakers—built by the Harnischfeger Corp.

4465 WEST NATIONAL AVENUE

MILWAUKEE, WISCONSIN



HARNISCHFEGER
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HOISTS • MOTORS • ARC WELDERS

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TO EVERY MAN WHO OWNS A PLANT OR RUNS A MACHINE:

Busy Executives...for 71 years...have found the man who sells Gargoyle Oils offers a Proved, Practical way to increase Manufacturing Profits



How "Correct Lubrication" Saves Millions for Industry

- 1 Curbs power losses... saves consumption and costs.
- 2 Decreases maintenance costs — eliminates unnecessary repair bills.
- 3 Improves production by greater machine efficiency.
- 4 Lowers lubrication costs.

TODAY—more than ever—lubrication is a science. Machines are more complex. Production schedules faster... more exacting!

That's why it will pay you to investigate "Correct Lubrication"... to see the Socony-Vacuum representative when he calls.

For Socony-Vacuum...the first to treat lubrication as a scientific prob-

lem... is backed by greater experience than any other oil company in the world.

When you buy Socony-Vacuum's Gargoyle Lubricants, you get oils and greases which are exactly, scientifically right for your machines. You get CORRECT LUBRICATION—that cuts costs... increases plant efficiency... increases profits!

SOCONY-VACUUM
CORRECT LUBRICATION



SAVES
MONEY
FOR
INDUSTRY

Read what 71 Years' Lubricating Experience...the Greatest in the Oil Business...can do for You. See Next Page.

1 Careful selection of the right kind of lubricants for all types of power and production equipment... curbing losses and waste of power generated or purchased.

2 Proper methods of application... the right oil in the right amount... aiding higher machine speeds... minimizing spoilage or rejects... protecting capital invested in machinery.

THE SUM OF THESE FOUR SAVINGS

4

1. REDUCED POWER CONSUMPTION
2. MORE CONTINUOUS PRODUCTION
3. DECREASED MAINTENANCE
4. LOWER LUBRICATION COSTS

= CORRECT
LUBRICATION

3 Experience in dealing with individual operating conditions... correction of out-dated practices often resulting in excessive repair and replacement costs.

4 A planned lubrication program... quality lubricants where necessary... other lubricants where their use will provide economy and not handicap machine efficiency.

SOCONY-VACUUM OIL Co.

INCORPORATED

STANDARD OIL OF NEW YORK DIVISION • WHITE STAR DIVISION • LUBRITE DIVISION • WHITE EAGLE DIVISION
WADHAMS OIL COMPANY • MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION OF CALIFORNIA



*If YOUR TELSMITH
CRUSHERS WERE
PURCHASED prior
to 1931*

*Speed Up
CRUSHING
•
IMPROVE PRODUCTS
by
MODERNIZING
OLD CRUSHERS*



TELSMITH

OUTSTANDING IMPROVEMENTS

INCREASE CAPACITY 25%

➡ You are losing profits every day, if your crushers are more than six years old—so remarkable are the improvements made by Telsmith since 1931. In today's *high-speed* models, Telsmith's margin of crushing superiority is more marked than ever before. Dozens of operators are finding the way to extra output and extra profits by modernizing Telsmith machines or by replacing less efficient crushers with modern Telsmith units.

Telsmith Crushers are now equipped with cut gears, roller-bearing countershaft and improved oiling system, permitting much higher crushing speed. Not only have the gyrations per minute been multiplied, but *the rock is crushed by*

impact—resulting in bigger output, a finer product, more cubical rock. These statements are not based on guess work or mere shop tests, but on results obtained by reliable operators—men you know—men who will confirm these statements. Why not find out? *Write for Bulletin C-11.*

TELSMITH MODERNIZATION SERVICE

If you are now using Telsmith *steel* crushers (Primary Breakers or Reduction Crushers) that are over six years old, they can be modernized for high-speed impact crushing by the incorporation of Telsmith improvements—at a moderate cost. *Write for the facts and figures on this service.*

● We do not recommend that the older cast iron and semi-steel crushers be operated at modern high speeds because of their vulnerability to breakage by tramp iron.

Associates in Canada: Canadian Ingersoll-Read Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

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SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WIS.

FOR LONGER WIRE ROPE SERVICE—

WILLIAMSPORT

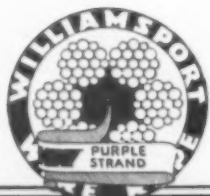
PURPLE STRAND "Form-Set"



If you have found that your operations are best handled by preformed rope, you'll do well to test the added quality of Purple Strand "Form-Set." A rope as outstanding in its manufacture as in its service.

Made entirely by Williamsport and preformed the Williamsport way, its wires test the highest and they are drawn through costly Carboloy dies for strict uniformity. More uniform, they lay up tighter and seat more firmly. Preformed, they avoid internal stress and wear longer. And to most operators "Form-Set" proves most economical by doing more work, because it lasts longer.

But test this superior rope on your own equipment and get the benefit of its added service. Why not arrange now to replace with Purple Strand "Form-Set."



WILLIAMSPORT WIRE ROPE CO.

Williamsport, Pa.

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INDUSTRY

Going

CEMENT



STURTEVANT

Already 213 STURTEVANT AIR SEPARATORS sold on approval to the Cement Industry and not a single rejection. This trend to STURTEVANT is not the result of chance or accident but because of superior results made possible by improved design and application. Operators everywhere appreciate the profit producing advantages of such STURTEVANT features as Lower Temperature — Specific Surface Area — Particle Size Control — Quality Cements — Lower Production Costs — Increased Tonnage and Increase in Mill Capacities 25 to 50% and a separation of any fineness from 60 mesh to micron size.

There is a STURTEVANT FOR EVERY SIZE JOB. Write for complete facts.

STURTEVANT MILL CO. HARRISON SQUARE BOSTON, MASS.

If your shovel could talk...

**GIVE ME BETTER
FRAGMENTATION
AND I'LL TAKE
BIGGER BITES**

SHOVEL BUCKETS grow in capacity with better blasting and bigger bites mean bigger production. A diet of properly blasted rock works wonders with the *appetite* of any man's shovel. And—when shovels are *eating well*, no quarryman *hungers* for profits.

Atlas Apex offers the right strength, the right velocity and the right action to assure fragmentation that means a full bucket at every bite. Atlas Apex makes possible more yardage. Now made in five grades—each with three velocities—meet a wide variety of quarry blasting needs.



Atlas Apex merits a demonstration in *your* quarry. Try it. The *mouthfuls* of rock your shovel will bite into mean more than a mouthful of words!

ATLAS POWDER COMPANY, WILMINGTON, DEL.

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ATLAS

EXPLOSIVES



IT'S A *Top Value* PLYMOUTH—



That Gives
**PERFORMANCE
LIKE THIS**

Dear Mr. [Name]
In reply to your letter, we wish to advise that we are using several different sizes of Plymouth Gasoline Locomotives, and we cannot speak too highly for them. They are satisfactory in every respect, very cheap in operation, and the repairs have amounted to practically nothing. We have had them at very hard work for the past seven or eight years, and we gladly recommend them to anyone having use for any sort of a locomotive.

Yours very truly,
THE WAGNER QUARRIES COMPANY

WJS-FHE

W. J. Sprow
President & Gen. Manager

● W. J. Sprow, President and Gen. Manager of the Wagner Quarries Company, Sandusky, Ohio wrote to a prospective Plymouth Locomotive purchaser. Needless to say that the prospective purchaser is now a satisfied Plymouth customer (name upon request). For descriptive bulletins write—

PLYMOUTH LOCOMOTIVE WORKS
(Division of The Fate-Root-Heath Co.) Plymouth, Ohio

TRACK HAULAGE
is cheaper with

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GASOLINE • DIESEL • BUTANE • PROPANE

INDUSTRIAL LOCOMOTIVES



An Improved Classifier is now offered by Nordberg

Wherever sand and gravel are to be recovered and classified hydraulically, this latest addition to the line of machinery built by Nordberg merits investigation. Automatic action, sharp line of separation, no power required, wide range of adjustment and low headroom—are but a few of the outstanding features of the

Nordberg-Wood Auto-Vortex Cone Classifier.

Write for a copy of this new bulletin No. 76 or, better still, tell us about your classification problem. Additional information on this machine as applying to your specific problem, will gladly be furnished.

NORDBERG MFG. CO., MILWAUKEE WISCONSIN

**NORDBERG
— WOOD**

**AUTO-VORTEX
CLASSIFIER**

**CONE and ...
BOWL TYPES**

GO Where the profits are ...WITH AN A-W PORTABLE



● Be prepared to handle those good-margin jobs that are beyond the fringe of your economical hauling range.

An A-W No. 100 lets you in on these jobs. Big in capacity, powerful and efficient—yet mounted on pneumatics for highway transport—low center of gravity for travel over uneven ground. Sets up for work in an amazingly short time—and outperforms any crushing plant of its size you've ever known.

With an A-W Portable as an auxiliary to your fixed plant, you're ready for *any* job. You'll then have a more well-rounded, balanced business that means far more extra profit than your portable plant has cost.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOIS

Austin-Western

The A-W No. 100 Plant is built to deliver volume, day-in and day-out. It's easy on power and easy on itself. For highest crushing speeds the primary breaker has unusually deep jaws, oversize roller bearings throughout, and extra strong oversize shafts. The secondary crusher, jaw or roll type, has equally rugged roller bearing construction, assuring the maximum in crushing output at low operating costs.

Look into the profit possibilities of an Austin-Western No. 100 Crushing Plant. Send for literature and costs.

The Austin-Western Road Machinery Co., V, Aurora, Ill.

☐ Send a representative.

Tell me more about the:

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☐ Gravel Washing Plants

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CR750

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FOR SAND WASHING AND GRADING



● A Dorrco Sand Washer, ready for trucking to a new location. ●



● Dorr Bowl Classifier, preparing concrete sand at the Grand Coulee Dam. ●



● Dorr Classifier, sand discharge end, at Boulder Dam. ●

USE A DORR SYSTEM

THERE is not simply one Dorr System, but several—each laid out and equipped to meet one of the sand preparation problems of the industry. Each is custom-built to meet a specific—not a general—set of conditions.

FOR BANK SAND WASHING

Use a Dorrco Sand Washer. Capacities 40 to 150 tons per hour. Sand dewatered before discharge with no loss of head. Entire system may be picked up and trucked from one location to another.

FOR TOP SPECIFICATION CONCRETE SAND

Use two or three Dorr Classifiers or Dorr Bowl Classifiers, arranged in series for producing several closely graded fractions. Mix and blend fractions to get desired Fineness Modulus. All sand for Boulder and Grand Coulee Dams was prepared in this way.

FOR GLASS SAND BLEACHING

Use the Earle Process (controlled by The Dorr Company) for removing discoloration by reducing the iron content to inappreciable amounts. Marketed on a license fee basis that assures user an attractive return on his investment.

These and other Dorr Systems are based on the same sound principles of mechanical classification that are practically standard throughout the chemical and metallurgical industries.



THE DORR COMPANY INC.
ENGINEERS • 570 Lexington Ave., New York

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ATLANTA

DORR TECHNICAL SERVICES AND EQUIPMENT ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

HOLLAND: Dorr-Oliver N. V., The Hague

FRANCE: Soc. Dorr-Oliver, Paris

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ENGLAND: Dorr-Oliver Company Ltd., London

AUSTRALIA: Crossle & Duff Pty. Ltd., Melbourne

SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg

JAPAN: Sanki Engineering Co., Ltd., Tokyo

ARGENTINA: Luis Fiore, Buenos Aires

BRAZIL: Oscar Taves & Co., Rio de Janeiro

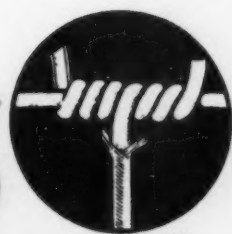
Cordeau is insensitive

● When Cordeau-Bickford Detonating Fuse eliminated the detonating cap from the bore hole, another old-time hazard went by the board. Large-scale loading operations extending over long periods may now be carried on with comparative security, because the detonation of each load is accomplished by a length of this insensitive fuse in direct contact with every cartridge. Only when the job is ready for firing is a blasting cap attached to the main line of Cordeau.

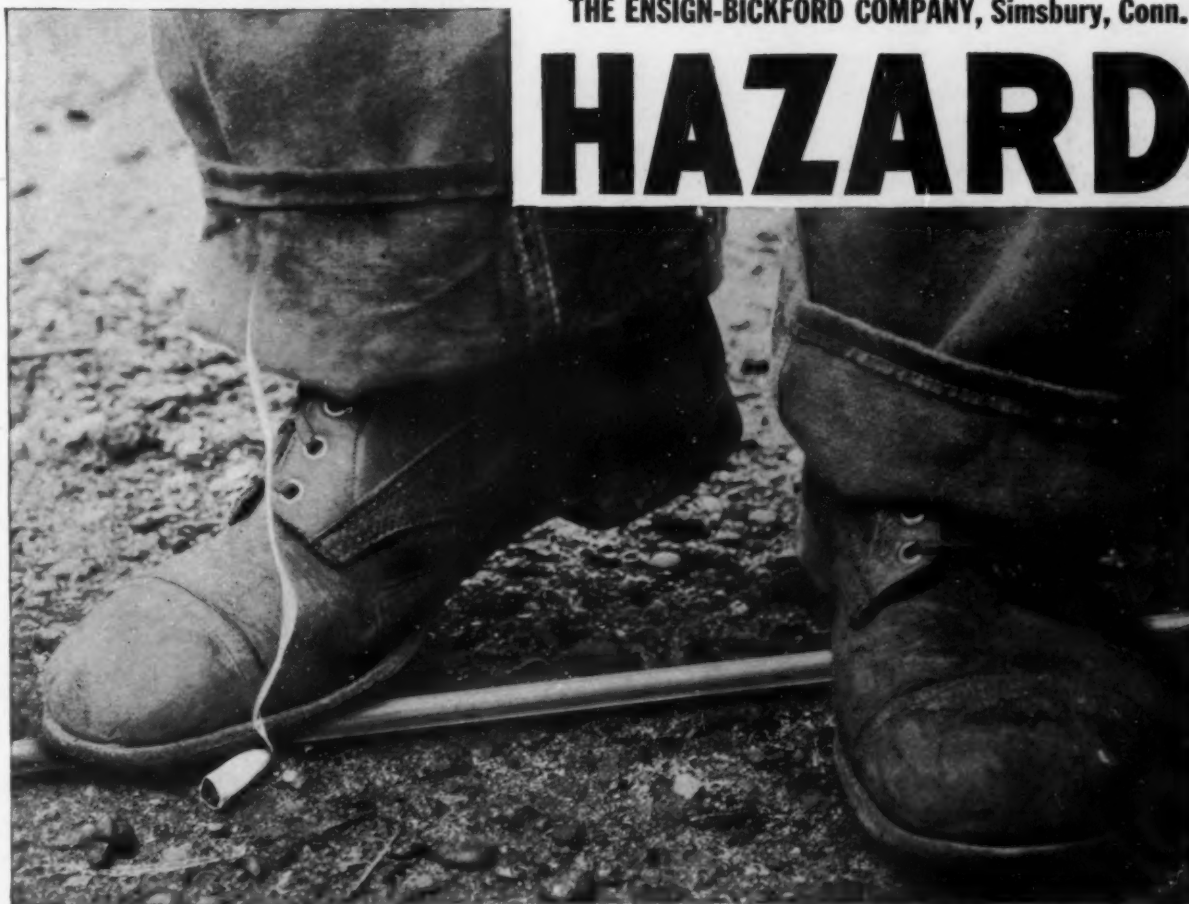
Correct use of Cordeau reduces to a minimum the risk of burned holes or danger from unexploded caps and powder after firing. Cordeau safeguards your investment of time and money—and it cuts down the hazards of blasting operations.

THE ENSIGN-BICKFORD COMPANY, Simsbury, Conn.

LESS



HAZARD



CORDEAU-BICKFORD Detonating Fuse

To empty stockhouse bins efficiently and quickly

Something to think about the many advantages to be gained by transporting cement and other dry pulverized materials from flat-bottom stockhouse bins and warehouse storage with the new Fuller-Kinyon Automatic Remote-Control Unloader. Some of these advantages are:

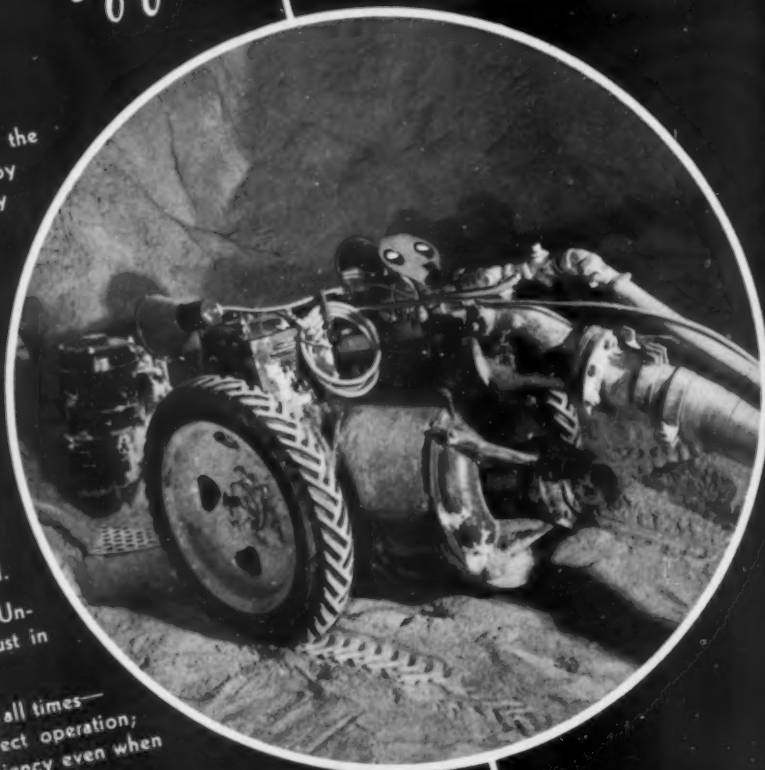
Speed—Minimum of time required for conveying.

Safety—Remote control keeps the operator out of the bin; out of danger from slides of material.

Minimum amount of dust—The Unloader creates very little dust in operation.

Operates at full capacity at all times—Slides of material do not affect operation; Unloader functions at full efficiency even when buried underneath material.

A transport system such as this may be the solution to some conveying problem you have. It may mean a saving you have been looking for. At least, it will cost you nothing to find out. Our engineering department will be glad to make studies of your problem and recommend an arrangement best suitable for your needs.



FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.

San Francisco: 320-321 Chancery Bldg.

P. 28

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AUTOMATIC BATCH WEIGHERS . . . BIN SIGNALS

HAUL YOUR HEAVY LOADS

ON

SELF-LAYING
STEEL RAILS

WITH

ATHEY

Forged-Trak

2-WAY DUMP TRAILERS



SOLVED

AT A BIG SAVING

THIS TOUGH MESABI RANGE
HAULING PROBLEM

Moving ore and overburden in this Mesabi Range Mine was formerly done with railroad cars. But railroad cars couldn't travel the steep grades and had to go round-about—turning cars in a short radius was impossible—and the cost of relocating roadbeds as the work progressed was high.

After analyzing all methods of transportation, the operators chose 16-yard ATHEY FORGED-TRAK 2-WAY DUMP TRAILERS, hauled by "Caterpillar" Diesel Tractors. Now ore and overburden are easily transported over steep grades. Turning in a short radius is simple. There is no cost of relocating tracks, because the tracks lay themselves. Operating costs, of course, have been greatly reduced.

Ask your "Caterpillar" Dealer how Athey Forged-Trak 2-Way Dump Trailers can solve YOUR hauling problems—or write us.

ATHEY TRUSS WHEEL CO.

5631 W 65th Street

Chicago, Ill.

Cable Address: "Trusswheel" Chicago

THE Easiest-Rolling ALL-WEATHER WHEEL



The Track Plates of the ATHEY FORGED-TRAK Wheel are made from rolled steel of ribbed design. They support the rails, performing the joint function of the ties and the ballast of a railroad track.

The Track Wheels are heat-treated for rugged strength and machined to provide a smooth rim for easy rolling over the track rails.

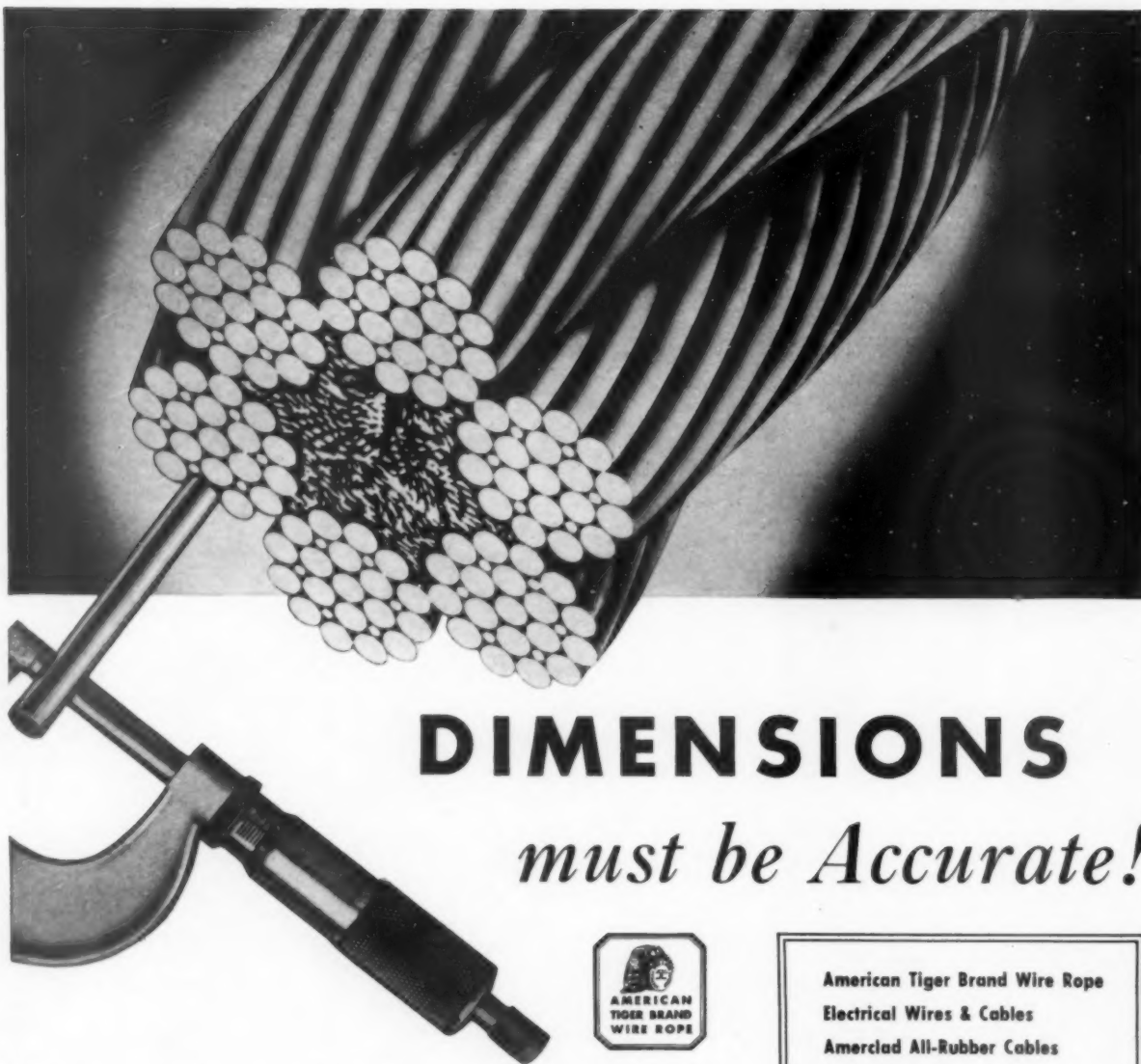


High Steel Rails set back from the ends of Track Plates provide a clean Wheel Rail under practically all operating conditions. This



minimizes friction and reduces the wear on both the Rail and the Track Wheels.

ATHEY
Forged-Trak
2-WAY DUMP TRAILERS



DIMENSIONS

must be Accurate!



American Tiger Brand Wire Rope
Electrical Wires & Cables
Amerclad All-Rubber Cables
Aerial Tramways
Tiger Wire Rope Slings
Tiger Wire Rope Clips

LIKE any complicated machine*, American Tiger Brand Wire Rope is precision-built. Dimensions must be accurate to insure the smooth working together of the many wires so they will handle your jobs efficiently.

Think how much you demand of wire rope—it must string or reeve easily and quickly . . . spool well . . . avoid whipping at high speeds . . .

stand up under the terrific jerks of starting and stopping.

That is the kind of service you can expect from American Tiger Brand Wire Rope. It is the product of engineers who have specialized for years in its design and it is backed by more than 100 years of wire making experience.

American Tiger Brand Wire Rope is available in either Standard

(non - preformed) or Excellay (preformed) constructions.

*American Tiger Brand Wire Rope is a machine, more complicated than many, fitting the definition "Any combination of mechanism for utilizing or applying power."

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY

Russ Building, San Francisco

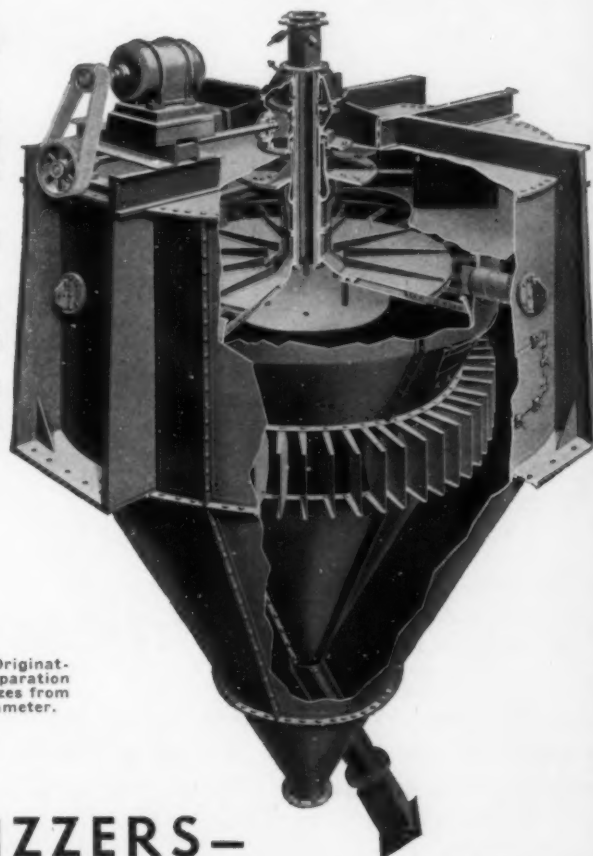
United States Steel Products Company, New York, Export Distributors



UNITED STATES STEEL

RAYMOND

RECORDS OF SEPARATOR PERFORMANCE



Built by the Originators of Air Separation . . . in Nine Sizes from 2'6" to 18' diameter.

WHIZZERS—

Specially adapted for "High Early" Grades

As cement specifications become harder to meet, the demand for Raymond Mechanical Air Separators continues to increase . . . for these machines are able to produce the finer grades of cement at a high rate of capacity that keeps down production costs.

The patented revolving whizzer gives the close separation of the fines and the uniformity of particle sizes, so necessary in making the quality cements required today. New efficiency in classifying HIGH EARLY STRENGTH CEMENT is made possible by the double whizzer arrangement now provided in Raymond Separators where extreme fineness is wanted.

This equipment will enable you to separate considerably finer than produced with ordinary installations, and you can readily obtain finished material testing up to 3000 specific surface area. Bulletin on request.

Note these results on CEMENT

56% Greater Output

Production of 180 bbl. per hour obtained with Whizzer Separator in closed circuit, compared to 115 bbl. from grinding mills in open circuit operation.

14% Power Saving

Reduction from 5.33 KW per bbl. down to 4.55 KW by introducing a Whizzer Separator into closed circuit system with tube mills.

40% Higher Test

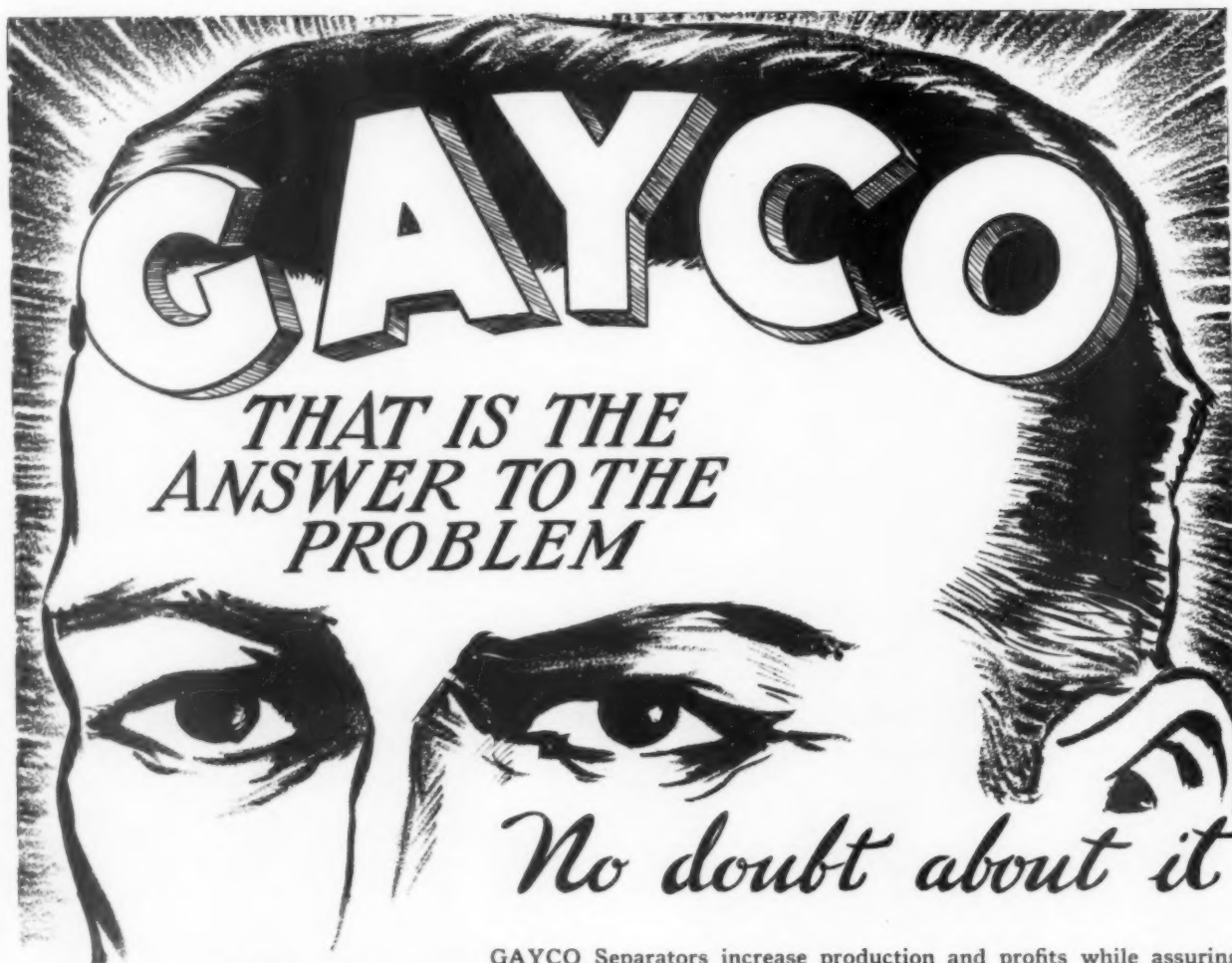
On cement classified with Whizzer Separator, tests upon one-day-old and two-day-old cements showed an average increase of 40% in tensile strength over that of cement from mills alone.

75% Increase in Specific Surface Area

In making high early strength cement, Whizzer Separator produced finished material testing 2450 surface area, as against 1400 for ordinary cement from mills alone.

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING CO., INC.
1307 North Branch Street CHICAGO

Offices in Principal Cities Canada: Combustion Engineering Corp., Ltd., Montreal



GAYCO Separators increase production and profits while assuring an absolutely uniform product of any desired fineness.

They will separate practically all dry fine materials—even many that are too sticky to be screened.

Cushioning of fine material is eliminated.

GAYCO Air Separators combine all the best features of efficient economical operation as determined by many years' actual experience with all types of materials under varying operating conditions. GAYCO Centrifugal Separators soon pay their initial cost by producing a better, more uniform, more salable product.

We also manufacture Bucket Elevators—Bin Gates—Belt Conveyors—Feeders—Grizzlies—Pulverizers—Rock Crushers—Revolving Screens—and furnishes complete crushing, screening and washing plants. Our engineers are always glad to cooperate with you.

Universal Road Machinery Co.

MAIN OFFICE
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LABORATORY
KINGSTON, N. Y.



RUBERT M. GAY - DIVISION
114 LIBERTY STREET
NEW YORK, N. Y., U. S. A.



"GAYCO" CENTRIFUGAL
SEPARATORS

"RELIANCE"
CRUSHING, SCREENING
AND
WASHING EQUIPMENT

IN PREFORMED ROPE



Loops are pulled, breakable knots are formed in Wire Rope.

INSTALLATION IS LESS COSTLY



Select the Rope that Fits Your Job

Wisscolay Preformed Wire Rope is inherently limp. It has no tendency to form into loops while being threaded through equipment. The time-consuming care required to avoid looping of non-preformed rope is not necessary when handling preformed rope. Threading is done with a minimum of stoppage

and delays and the entire installation is quicker and less expensive. Savings in installation costs and economies of use many times offset the slightly higher purchase price of Wisscolay Rope. Write

today for full particulars.

WICKWIRE SPENCER STEEL COMPANY, General Offices: 41 East 42nd Street, New York. Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; Export Sales Dept.: New York.

WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Portland, Seattle.

WIRE ROPE by Wickwire Spencer



**WISSCOLAY
PREFORMED**

Wickwire Spencer also manufactures all sizes and types of Wire Rope in Wisscolay.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City

Please send me my free copy of your popular, new money saving manual, "Know Your Ropes".

Name _____

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Address _____

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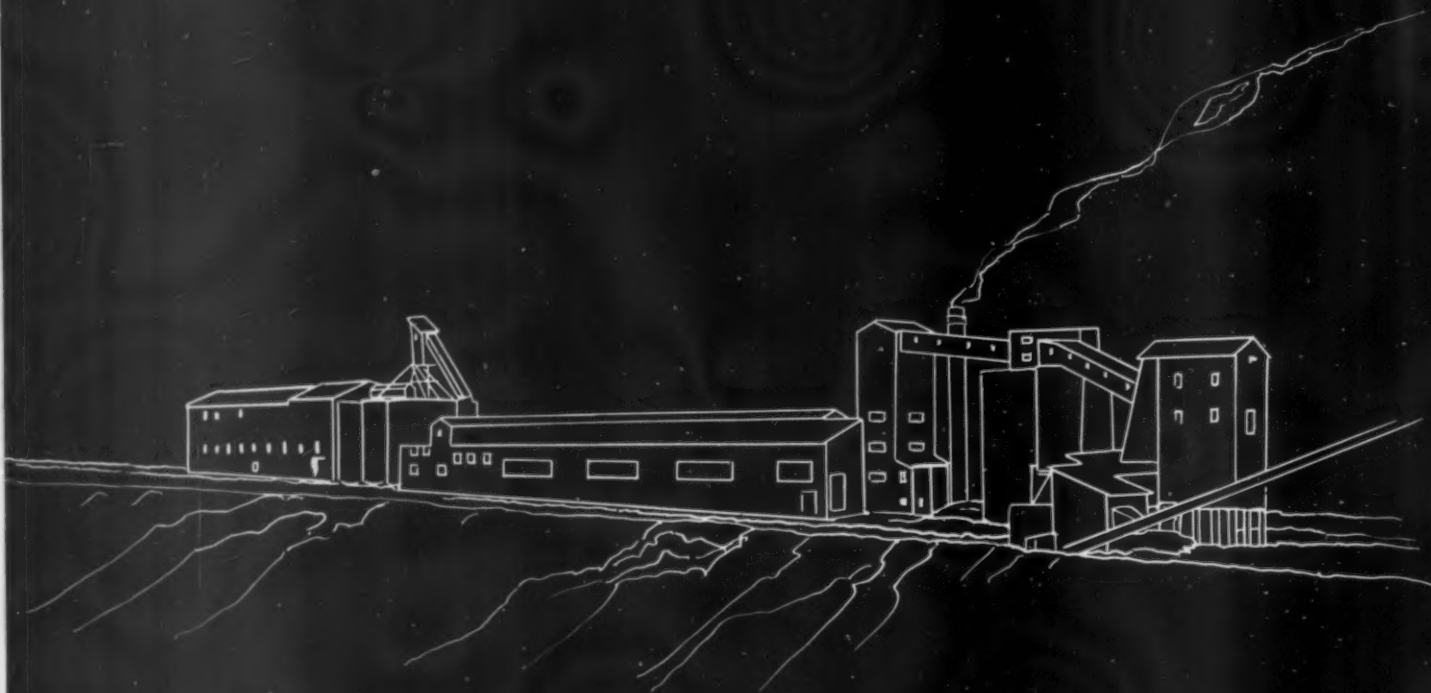
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RP



LOWER TONNAGE COST

with HEWITT Conveyor Belt



The new H. E. Millard rotary kiln lime plant, Annville, Pa.,
equipped with HEWITT Conveyor Belt.

● Up . . . up . . . to increasing tonnage records in materials handling. That's part of the story of HEWITT conveyor belts. The other part is found in progressive plants where costs are checked. Here is established the proof that HEWITT conveyor belts lower tonnage costs. For in back of the production of all HEWITT industrial rubber goods is that main purpose . . . to add extra stamina and sturdiness, to build in longer life, to the end that YOUR operating costs may be lowered. Wherever

your plant is located, a nearby HEWITT distributor will welcome the chance to prove the wisdom of a switch to HEWITT hose and belting. He is listed in the classified telephone directories of major industrial centers under "Rubber Goods" or "Belting".

HEWITT
RUBBER CORPORATION
BUFFALO, NEW YORK

HOSE • CONVEYOR AND TRANSMISSION BELTS • PACKING

Rock Products

Vol. 40

Chicago, September, 1937

No. 9

Labor Is Still a Commodity

COMMODITY in one sense is defined as "an element of wealth," "an economic good." In that sense labor is a commodity, just as are capital and management. These three commodities or elements are the source of all wealth.

Under planned economy, or New Deal economics, it has been popular to disregard labor as a commodity, with such slogans as "human rights are above property rights," etc. The idea seems to be that wages and hours of labor can be fixed by statute regardless of the laws of economics involved.

Fortunately the wages and hours bill passed by the United States Senate was shelved in the House of Representatives and did not pass at the recent session of Congress. However, the issue is not dead. Before Congress meets again it is to be hoped that more study and consideration will be given the proposed act and all its implications.

It is illogical and impracticable to establish wages and hours of labor on a national scale. The only justification for it is the theory that competitors will thus be placed on an equal footing. As conditions exist, and will always exist, under our present system of economy, wages and hours are determined by local conditions, which are very apt to be temporary in any particular case.

Wages paid by rock products operators are not determined by what other operators in distant parts of the country are paying, but by the wages paid in noncompetitive industries in the same locality. In some localities, particularly in the big cities, and in densely populated industrial localities, there is apt to be a chronic surplus of labor—but labor costs are high for artificial reasons, notwithstanding.

The only logical and happy solution of both the unemployment and the wage and hour problems is therefore a study of local conditions to see if new industries can be brought in, or present industries expanded, or wage rates adjusted to absorb surplus labor, or the surplus labor moved, at government expense, if necessary, to such other localities as can furnish employment.

The present method of attacking the unemployment problem, which is the kernel of all labor problems, has the effect of subsidizing unemployment in some localities while a real shortage of labor exists in other places. The scarcity of farm labor in the Middle West this year is a good example.

To take a concrete example, suppose we have a rock

products plant in a country locality and the problem arises of increasing production, or of merely decreasing costs of present production. The owners have three possible angles of approach: (1) They may invest more money in labor-saving equipment; (2) they may hire a better grade of management; (3) they may employ more labor (meaning longer working hours also). The determination will be made as to which of the three commodities—capital, management or labor—is the cheapest in the long run.

Such a concern could obviously afford to pay better than relief wages, and living conditions may be such that labor would be well off at much lower wages than in a congested area. For example, there may be enough farm land available so that employees could have gardens and raise a substantial part of their provisions. The operating season may be short, so that long work days and weeks are highly desirable from the employees' point of view.

Present Laws Cannot Cure

However, if wages and hours are fixed regardless of such considerations, the plant owners have little choice. New capital will be cheaper than more labor, or even present labor, and all their energies will be directed to lowering the labor requirement to the absolute minimum. And that tendency will continue. True, that the demand for new equipment will create a demand for labor to make the equipment; but under our present scheme of industrial economy there is no way to move the surplus labor from the rock products plant to the equipment plant locality; nor is there any way to make machinists out of common labor.

In other words, as we are proceeding at present under national laws designed to cure unemployment, labor has no chance at all, such as it would have under unfettered economic laws. For years the United States provided a solution of the economic problem of unemployment for the rest of the world—by a free play of economic law, if you want to call it law. Certainly, by study and investigation of our own domestic problem of temporary unemployment a solution can be found.

To be sources of wealth, commodities must be commodious, or must be *serviceable*, or movable. We recognize this clearly in the case of capital. We know that a miser's hoard is not wealth either to him or to the community. We know that unused talent for management, or for

accomplishing things, is not wealth. We know that a horde of unemployed men and women is not wealth.

A Neglected Profession

Men spend their lives learning ways to employ their capital or their special talents of management to advantage, but we have not scratched the surface in a study to employ labor to advantage. Where labor enters the picture it has been only incidental to the employment of capital; and it is only too true that the employment and care of capital have received far more solicitous attention than the employment and care of labor.

Labor is not the same kind of a commodity as capital or personal property generally. It has been treated as such in our capitalistic system, much to that system's disadvantage, and perhaps to its ultimate failure. But it can not be disregarded as a commodity, altogether, if the system is to continue to exist. The problem of unemployment can not be solved unless labor is considered as a commodity, in the sense that we have used that term.

Therefore, we are not attempting to show that labor as a commodity should be bought and sold for the lowest price at which it can be obtained; but, neither can it be set up as a commodity of standard value for the country as a whole, unless we want to resort to complete communism, where some political authority will order all of our lives.

If we are to remain a free people—with some degree of individual freedom—we must accept the fact that labor, or skill in management, or capital savings, are worth more in some places, or to some employers, and at certain times, than in other places and to other employers, at some other time. Unless we are left free agents to market our labor or talents to our own best advantage, there is no freedom at all. The government, labor unions, trade and professional associations can be of great service in aiding us to market these commodities, but when government attempts to dictate the terms, we become a state commodity—slaves rather than citizens.

The government could render a great service to industry and to labor, by facilitating the necessary shifts of labor from place to place, and from industry to industry, and by serving as arbiter in arriving at fair wages and working conditions under the particular circumstances. The obvious and logical way to do this would be through local business and labor leaders, who could continuously study and be familiar with local conditions—provided of course that such leaders could be found who really have a desire to render genuine civic service.

A Government Founded on Self-Help?

We can not see how any central bureaucracy can ever do more than fumble with the problem, until it is given the authority to dictate the lives of all of us. Most of us see that tendency now. It is natural. If you yourself were given the job, and you found yourself constantly checkmated by lack of authority, you would ask for more and more authority. If you were a great enough genius you might, with absolute authority, find the answer. But who would do the job when you shuffled off? And what would happen to our American democracy?

Isn't it better to fall back on the old adage that "many heads are better than one," and seek not a solution of the whole problem at once, but to attempt to solve it

piecemeal, one locality at a time? What justification is there for continual criticism of the national administration's attempt to solve the problem, crude and ineffectual as that attempt is, if we sit back and say it is *their* problem, not ours? The fact is that it really is *our* problem (we, the people of the United States) and not theirs (the administration's).

Our federal government was founded on the assumption of the acceptance of maximum local responsibility—both individually and collectively. Only through failure of that acceptance of local responsibility has the federal government been able to become overpowering. It is all right to talk about the constitution and the kind of government it was intended to set up, but the fact remains that if the federal government had not stepped into the breach, we would have had conditions little short of anarchy. If the federal government continues to become more oppressive it will be only because local governments continue to be irresponsible.

The way to prevent the federal government becoming something akin to communism or fascism, which are pretty much the same thing in the last analysis, is to go back not merely to the letter of the constitution, but to the spirit of it. Business men should study a little American history as well as read the constitution. There is such a thing as American idealism as well as rough-shod liberty to be found in that background.

It seems to us that the easiest method to start is to get acquainted with your congressman. Get local organizations of both business men and labor together and make your congressman familiar with the unemployment problems of his own district and how your organization can help to solve it. Make him feel that he is the representative of *your* district or locality, as the constitution intended he should be, and not the cat's paw of some national pressure group, or of the chief executive. If he can be reelected by serving the people of his own district, he *will* serve the people of his own district, regardless.

Labor Relations Ethics Rather Than Law

As to the problem of hours and wages, after observing NRA (and being ardently in favor of that experiment), we are not convinced that it can be solved by law. We think the solution is much simpler. We can think of no better way of stating it than it was stated to us by a prominent cement manufacturer: "Employers must realize that labor is entitled to a larger share of the take." That means that capitalists and promoters must be satisfied with a smaller share; that very possibly management may have to take a smaller share in some cases.

What we need is not so much law as a new philosophy of business and industry; a more thorough appreciation of the parts played by the three elemental commodities—labor, management and capital—in the creation of wealth—common wealth as well as private wealth. Present and threatened laws have undeniably done much to arouse civic consciousness in hard-boiled promoters and capitalists; but further attempts in that direction are very apt to entangle the few economic truths that we all know, so much more than they are now, that it will take another generation to untangle them. We must look to management, which is in the middle, more than to owners of capital or to politicians, for a sound economic solution of our industrial relations problems.



Trucks discharging into the primary crusher

OPERATING FLEXIBILITY, low power costs, emergency push-button electrical controls and the ability to meet any stone specification for either unwashed or washed stone are features of the new plant built by the Pennington Trap Rock Co., Pennington, N. J.

creased to 700 tons of crushed stone a day, in 1933, still using steam power. Construction of the new plant began in December, 1936, and operations started June 15, 1937. The new plant is powered by Diesel engines and has a capacity of 250 to 300 tons per hour.

Flexibility, Low Power Cost, Push-
Button Control At

NEW PLANT

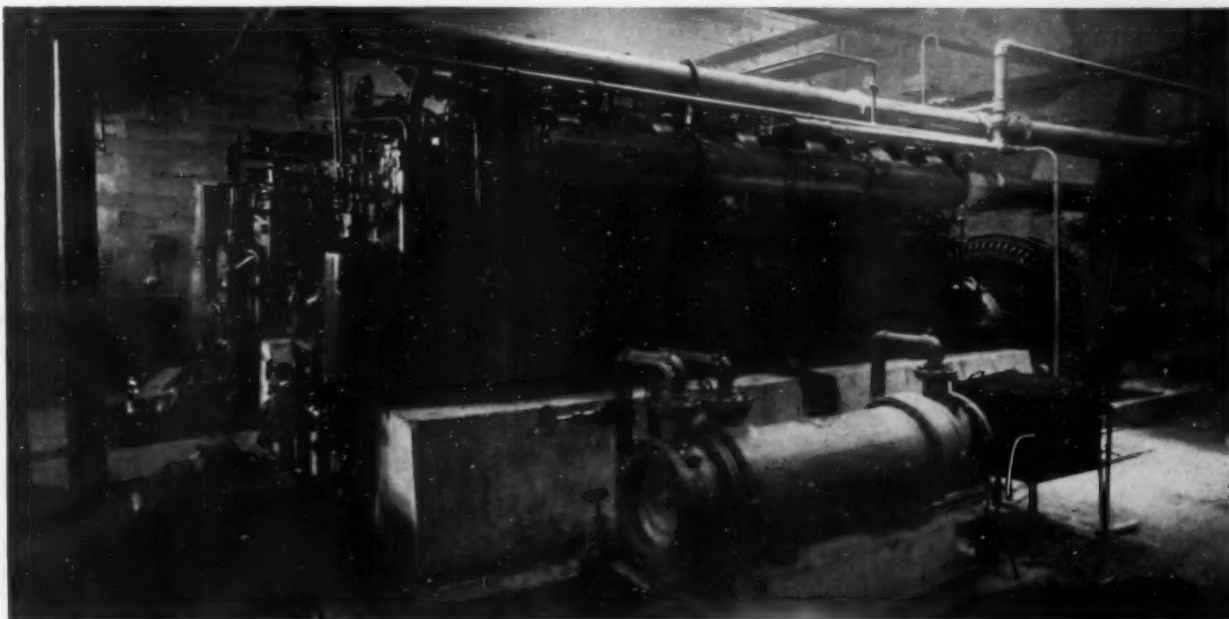
of the Pennington Trap Rock Co.

By Bror Nordberg

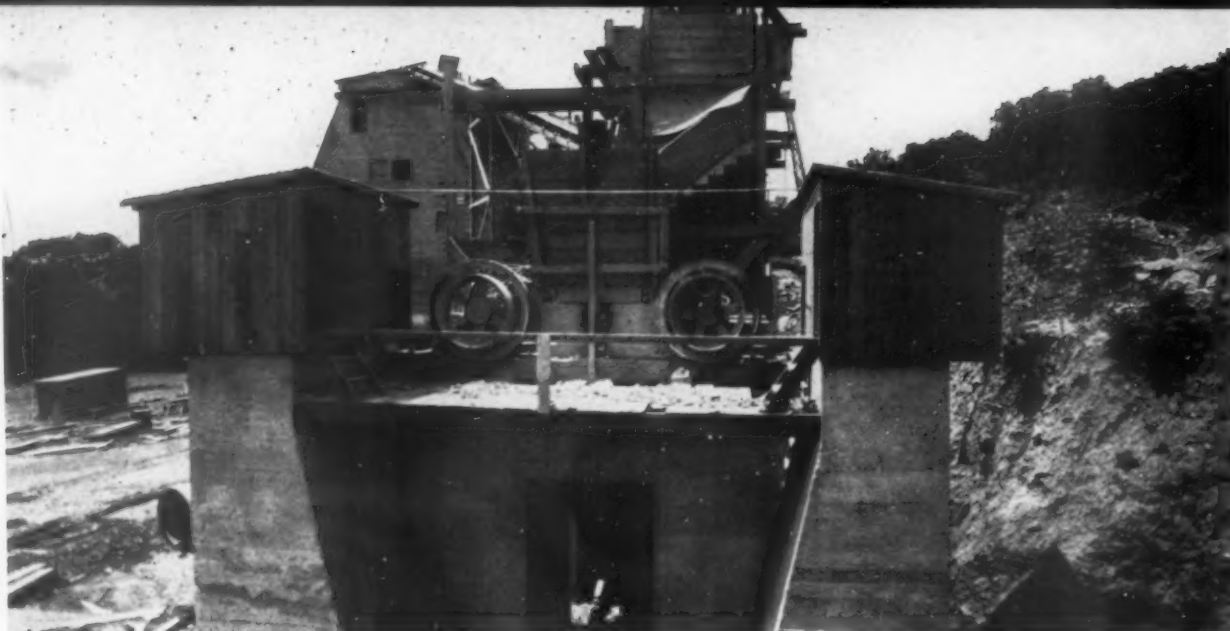
The new plant was constructed at a quarry which has been operated for many years. The original plant, built in 1910, was powered by steam and had a daily capacity of 400 tons of crushed stone. The capacity was in-

The quarry is located on a hillside near the plant, the deposit being a very hard and tough trap rock. Stripping is done just ahead of each shot by an Erie $\frac{3}{4}$ -yd. steam shovel. On the average, from 40,000 to 75,000 tons of rock are brought down in each blast.

A 125-ft. face is being worked at the present time. Blast holes are drilled by a Keystone well drill with a $7\frac{1}{2}$ -in. bit to 5 ft. below the quarry floor, to maintain a level floor by eliminating irregular toes. Holes are spaced 20 ft. apart and 20 ft. back from the face. It is claimed that from 7 to $7\frac{1}{2}$ tons of rock



Two 450-hp. Diesel engines drive generators to furnish electricity for all plant motors



Four secondary crushers operating as a unit to make various sizes of crushed stone

are "shot down" for each pound of dynamite.

Rock is hauled to the primary crusher in six Mack trucks loaded by two Model 37 Marion 2-yd. steam shovels. The trucks are each equipped with Easton end-dump bodies and carry 11 tons of rock to the load.

A McMyler steam crane converted to air is stationed at the 50-ton hopper feeding the primary crusher to assist in dumping the rock. The truck bodies are tilted by hooking a chain to them from the end of the crane boom. Directly below the hopper is a Farrel-Bacon 42- x

60-in jaw crusher, which reduces all rock to minus 4-in.

Crushing

After passing through the primary breaker, the stone is carried over a 36-in. Robins belt conveyor, 126 ft. centers, to a Robins Gyrex 5-ft. x 20-ft. single-deck scalping screen. The screen is directly over a battery of four secondary crushers operating as a unit.

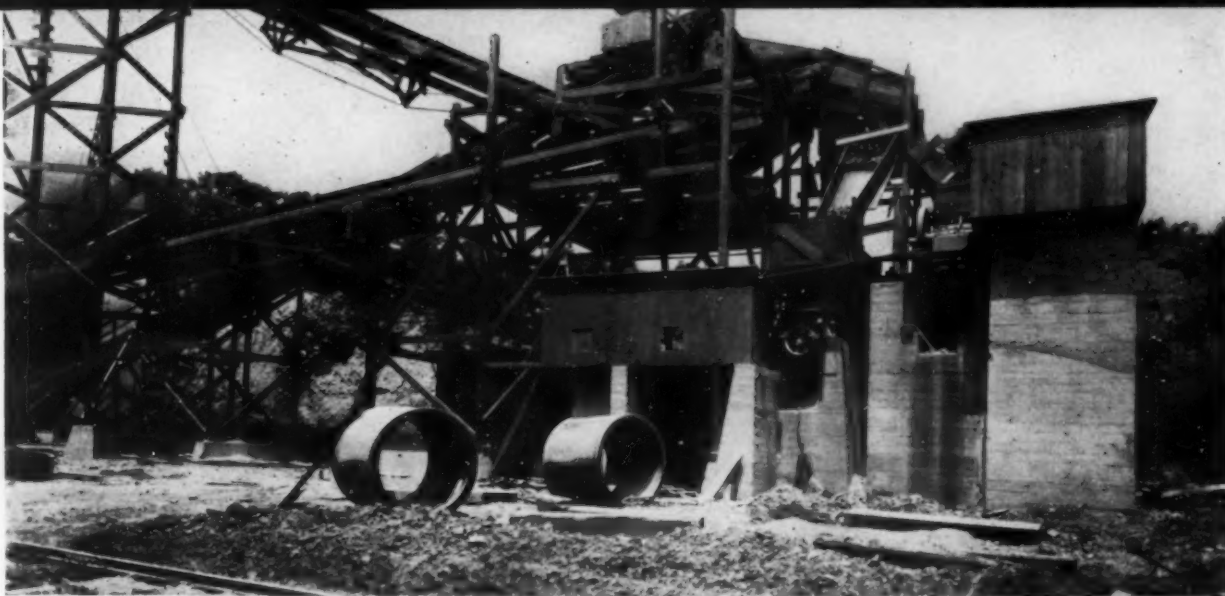
Stone passing through the 2½-in. square openings goes direct to the sizing screens over the bins. Plus 2½-in. stone drops from the screen to a 150-ton surge bin over the four secondary crushers.

The bottom of this bin has four openings one above each crusher. Approximately one-fourth of all stone in or flowing through the surge bin will naturally go to each crusher when the four openings are open.

The secondary crushing capacity is considerably greater than is required, to minimize choking, and so that one or even two crushers can be down for repair without serious interruption of operations. The plant is so arranged that any stone sizes up to and including railroad ballast can readily be furnished to meet state specifications for Pennsylvania, New York and New Jersey. Speci-

System of conveyors carrying stone to and from secondary crushers in the background





Oversize stone from the scalping screen above goes to the secondary crushers

fication changes also may be satisfied with minor plant changes. The secondary crusher arrangement makes for flexibility in that the percentage of any stone sizes desired can be produced by varying the crusher openings of any crushers. Generally, all four crushers are set for different openings to differentiate sizes of stone to go to the sizing screens.

Throughs from the four crushers are carried over a 30-in. Robins belt conveyor, 75 ft. centers, back to the conveyor belt from the primary crusher to again pass over the scalping screen.

Sizing

All minus 2½-in. stone is carried over a 30-in. Robins belt conveyor, 120 ft. centers, to the screening plant over the

bins, where it is distributed over a dumping table to two 4-ft. x 20-ft. Symons 2½-deck horizontal screens. The throughs from these screens are carried over two 24-in. belt conveyors, 25 ft. centers, to a second set of two similar screens for further sizing.

Regularly, seven sizes of stone are made: dust, ¾-in., ¾-in., ¾-in., 1-in., 1½-in. and ballast. These are stored in seven 400-ton bins below the sizing screens. Trucks or railroad cars are loaded in the runways below the bins. Each bin has two sliding gates operated by a man below with a chain and pulley through a pinion gear.

Any stone in the bins from ¾-in. to ballast can be re-crushed by drawing from side gates to a 30-in. Robins belt conveyor, 85 ft. centers, which discharges

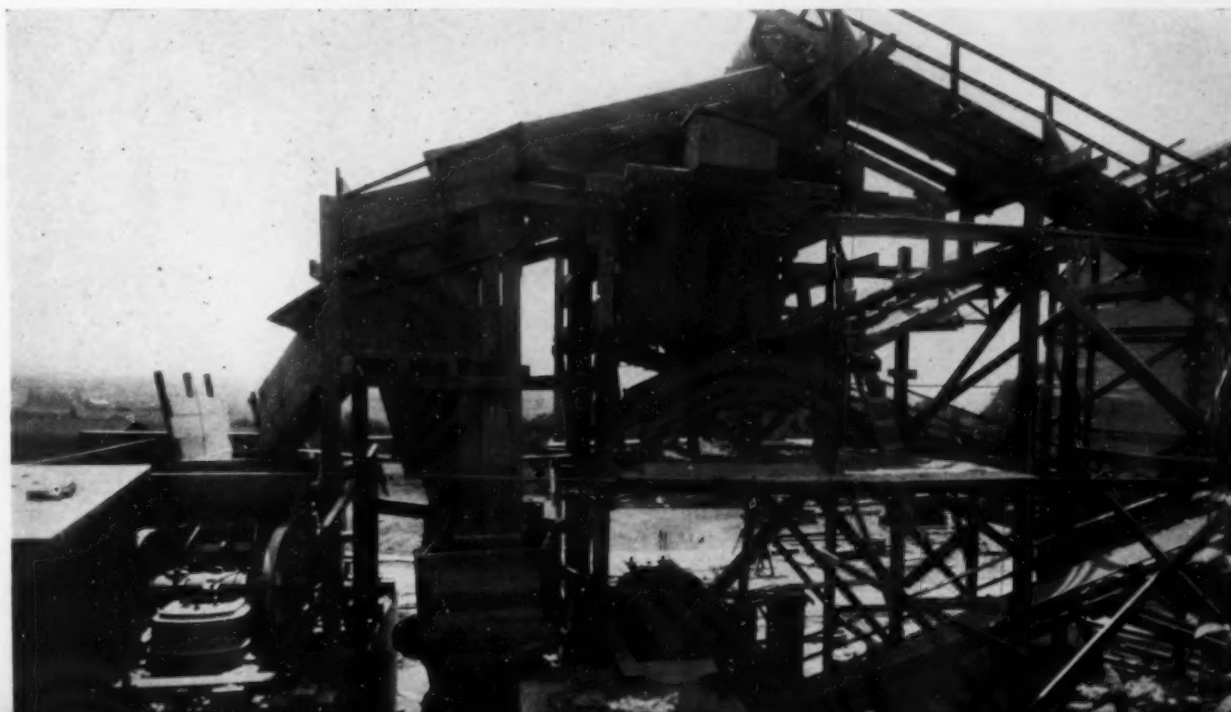
to a Symons 4-ft. short head cone crusher. This crusher has a capacity of 125 tons of stone, 100 percent passing the ½-in. screen per hour. Fines are generally passed through this crusher for use in oil surfacing of roads. Throughs from this crusher are re-circulated back over the original scalping screen.

The Symons sizing screens have a capacity of 1000 tons of stone per hour, much in excess of the maximum plant requirement, to allow close contact of every stone particle with the screen cloth and for a reserve to take care of load fluctuations.

Blending

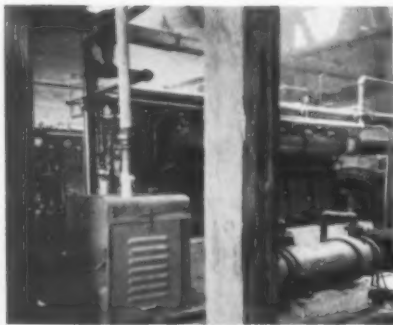
On the other side of the bins, a 24-in. belt conveyor has been installed for

Another view of the four secondary crushers to which the load is split





Two views of the primary crusher which reduces all stone to minus 4-in.



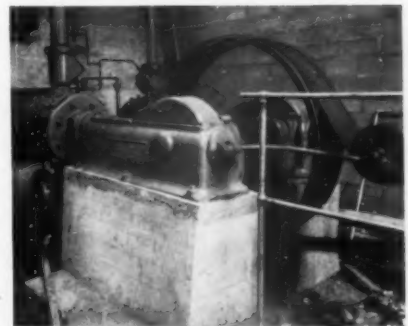
Small gasoline engine to drive emergency air compressor for starting Diesel engines

blending different sizes and for washing, if desired. The belt is fed from any of seven discharge chutes from the bins. This conveyor is reversible. When different sizes are to be blended, the belt

travels in a clockwise direction and discharges directly into trucks or cars. When the travel is in a counter-clockwise direction, the belt discharges to a revolving washing screen and into cars or trucks after passing over a drain chute. In this way, different sizes of stone may be blended and/or washed at will, without interference to the regular flow of stone through the plant, and even if the plant is not in operation.

Washing

There is a scarcity of water available for washing in this locality. Two 5000-gal. concrete water boxes are used so that water can be settled and re-used. Water is brought in by means of a Triplex pump one mile from the plant and circulated from one tank to the other, with an occasional addition of water to replace that lost by evaporation and



This compressor furnishes the air to drive all air-driven equipment in the plant

spillage. Water is pumped to the screen by a Homelite 2-in. pump. All rail shipments are made over the Reading railroad.



General view of plant with the power house in the foreground

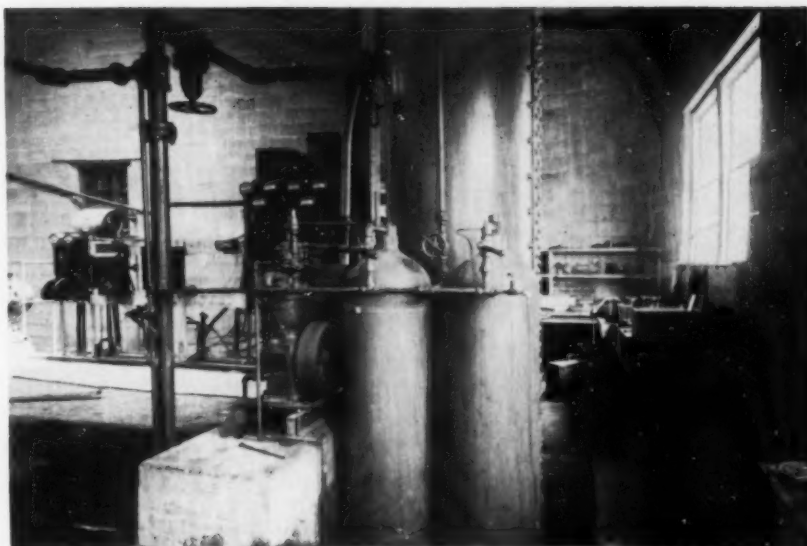
In addition to bin storage, stock piling is sometimes done by hauling stone in railroad cars from the bins. Stone in open storage is handled and reloaded for shipment by a steam locomotive crane with a $1\frac{1}{2}$ -yd. bucket, and a Universal gasoline crane with a $\frac{1}{2}$ -yd. bucket is used for general and emergency duty around the plant.

For such a large tonnage of stone, the plant is operated with unusually low labor costs. Four men run the plant. One man is stationed at the primary crusher, a second man is at the secondary crushers, with one man at the sizing screens and a fourth under the bins.

Push-button electric switches are provided at these four locations so that in event of emergency any of the four men can immediately stop all moving machinery under his jurisdiction.

Electricity for all plant operations is generated by Diesel engines, and power costs are exceedingly low. Two Busch-Sulzer, 450-hp., straight-line injection-type, Diesel engines were installed when the new plant was built, each direct-connected to a Westinghouse 375-kv.a. 60-cycle a.-c. generator. Excitation is by a 7.5-kw. 125-volt direct-current generator.

Each piece of equipment in the plant has one motor and is driven either through a direct connection, V-belt or



Emergency air compressor to start Diesel engines

gears. Diesel fuel oil is purchased in large lots and stored in a 10,000-gal. tank adjacent to the power house. The cooling water is circulated through a tower cooler and re-used in the engines. Circulating lubricating oil is passed through a Schutte and Koerting oil cooler.

The engines are started by compressed air at 350 p. s. i. For emergency starting, the plant is equipped with a Gardner-Denver vertical air compressor, V-belt driven by a Continental gasoline engine.

Fuel costs are low. Tests have been conducted to determine how much fuel



View of the quarry with the primary crusher in foreground

is required to process each ton of stone in its complete travel through the plant. Each truck-load of 11 tons of stone has been found to require 2 gal. of Diesel oil for power in completing the circuit, which at a cost of 5½¢ per gal. represents a power cost of 1¢ per ton of stone in the bins for fuel oil only.

The plant has 19 General Electric and Westinghouse motors representing a total of 825 hp. under full load. When all equipment is under full operation, including blending and washing machinery, 40 gal. of fuel is required per hour of operation. Officers of the company are Mrs. V. W. Goll, president; M. H. Hausman, general manager; P. Matthews, superintendent; and Jack Dawson, sales manager.

Power Failure

MONOLITH PORTLAND MIDWEST CO., Laramie, Wyo., recently was forced to shut down for several days due to a shortage of electrical power. The generator of the Western Public Service Co. supplying power to the cement plant was burned out several days after the power line to the plant had been disabled by lightning.

Opening Quarry

OAK HALL LIMESTONE CO., INC., Bellefonte, Penn., recently started a new limestone quarry operation on the Hassinger-O'Brien lease in Benner township. For the present, men are clearing timber and building a 600-ft. siding to the Bellefonte Central Railroad tracks. A mine shaft is to be sunk and a new modern rotary kiln will be constructed at a later date according to reports. The management hopes to be able to ship stone within six weeks.

Universal Atlas Appointments

UNIVERSAL ATLAS CEMENT CO., Chicago, Ill., in keeping with the company's policy of advancing members of the organization as opportunities arise, has announced the following new elections and appointments:

George H. Reiter, vice-president, and W. L. Greenly, assistant to vice-president, Chicago, Ill.; A. C. Cronkrite, vice-president, and Paul F. Keatinge, assistant to vice-president, Chicago, Ill.; O. H. D. Rohwer, vice-president, and James D. Scovel, assistant to vice-president, Chicago, Ill.; George S. Neel, sales manager, Des Moines, Iowa; L. B. Thomas, district sales manager, St. Louis, Mo.; A. O. Stark, vice-president, W. R. Heckendorn, sales manager and Floyd L. Mabie, manager, Atlas White bureau, New York, N. Y.; and W. A. McIntyre, sales manager, Phila-

delphia, Penn. F. L. Stone and Paul C. Van Zandt are also vice-presidents of the company.

Operating Again

MONARCH PORTLAND CEMENT CO., Humboldt, Kan. plant, resumed operations recently after a short shutdown, when the majority of men were kept working.

Declared in Liquidation

MARIANNA LIME PRODUCTS CO., Marianna, Fla., was declared in liquidation by a court order of Judge A. V. Long of Gainesville. The company had filed a petition for reorganization under the federal bankruptcy laws originally but no steps toward that end had been undertaken by the petitioner. All capital stock of the concern is owned by the Industrial Loan and Guaranty Co. The court had previously allowed claims of the Industrial Loan and Guaranty Co. and the Trustees' System Service Corp. against the debtor in the sum of \$350,000 and interest.

Cement Shipments Up on Coast

BUREAU OF MINES reports show an increase in the use of cement during the first half of 1937 along the Pacific coast despite a drop in new engineering contracts. Official figures showed that 7,541,915 bbl. were shipped to consuming points for that period as compared to 7,517,618 bbl. taken by consumers for the first half of 1936. California accounted for the bulk of the consumption, but along with Oregon registered a decline from 1936 use. This, however, was more than offset by the increase in Washington receipts at retail points and works locations.

Washington consumption increased nearly eight per cent. The biggest single stimulating influence on current demand and production along the coast was the Grand Coulee dam construction in Washington.

Plant Reopens

PACIFIC PORTLAND CEMENT CO., Redwood City, Calif. plant, recently resumed operations after four unions accepted an agreement ending a three day strike.

Reopens Plant

ALPHA PORTLAND CEMENT CO., Manheim, W. Va. plant, resumed operations in August after a shutdown begun on July 1.

Building New Office

SOUTHERN STATES PORTLAND CEMENT CO., Rockmart, Ga., has begun construction of a new \$30,000 concrete office building to replace one destroyed by fire March 30.

Installing Kiln

CONSOLIDATED CEMENT CORP., Fredonia, Kan. plant, is being rehabilitated extensively. Some of the equipment being installed, including a 240-ft. kiln, is being taken from the corporation's plant now being dismantled at Mildred, Kan. The older and smaller kilns at Fredonia will be retained for stand-by service.

First Annual Picnic

DEWEY PORTLAND CEMENT CO., Davenport, Iowa plant, recently held its first annual picnic for employees at the Rosstenbach farm. Features of the picnic were an interesting program of races, horseshoe tournaments and soft ball games for both men and women.

Building Show Exhibit

PORTLAND CEMENT ASSOCIATION will be one of the exhibitors at the Exposition of Building and Industry to be held in Cleveland, Ohio in October. The exposition is sponsored by the Mortgage Bankers' Association of America to include exhibits of leading manufacturers, associations and industrial corporations whose products and services have a direct bearing on building and the financing of building.

Asbestos-Cement Pipe

KEASBEY AND MATTISON CO., Ambler, Penn., manufacturer of asbestos and magnesia products, has announced plans to erect two new plants at a cost of \$1,260,000 for the manufacture of asbestos-cement pressure pipe. One of the new plants at Ambler will have a weekly capacity of 150 tons of asbestos-cement pipe, and the second plant at St. Louis, Mo., will produce 100 tons per week.

Rewarded for Safety Record

ASH GROVE LIME AND PORTLAND CEMENT CO., Chanute, Kan., recently entertained 450 employees and guests at the plant for going through the month of June without any loss of time due to accidents. The program included dancing, music, talks and professional entertainment. There have been no lost time accidents at this plant for over 900 days.



New plant of Portland Sand and Gravel Co., with stone storage for chip sizes on left

PORTLAND SAND AND GRAVEL CO. BUILDS Modern Fire-Proof Plant

After Losing Old One By Fire

By Bror Nordberg

AN ALL STEEL PLANT of considerably greater capacity and efficiency has replaced the plant of the Portland Sand and Gravel Co., Portland, Penn., destroyed by fire a year ago. The new plant has an approximate capacity of 200 tons of washed sand and gravel per hour and has provisions for making stone chips, without operating the primary crusher and without excavating in the pit deposit, when demands for sand and gravel are low, or the bins are full of the regular run product.

The deposit under excavation is quite varied in the relative proportions of fines to large stone and contains numerous boulders. There is a difference in this relationship in the pit, enough so that two separate tracts of land near each other are being worked, the selection being determined from the demands for coarse or fine material.

Excavating is done by a Bucyrus-Erie 1½-yd. shovel and a P & H 1¼-yd. shovel (both electric), and the mixture of sand and stone is hauled in four Ford trucks to the elevated field hopper, with about 5 tons of material in a load. The haul averages about ¾-mile in length. Stone over 15 in. in size is rejected by a rail grizzly over the hopper.

Processing Stone

Stone from the field hopper is fed to a Robins 36-in. x 78-in. double-deck vibrating scalping screen by a Robins 33-in. by 7-ft. 10-in. oscillating feeder. When running regular sand and gravel, all throughs from this screen (minus 6 in.) by-pass the Farrel-Bacon 24-x 36-in. primary jaw crusher, driven by a 100-hp. motor. When it is desired

to manufacture chip sizes or to store stone for that purpose, plus 6-in. stone is passed through the crusher and broken once before being stocked.

The crusher discharge may be diverted to either of two parallel belt conveyors, according to the purpose for which the stone is to be used. Ordinarily, the crusher discharge goes to a 30-in. belt conveyor, 118-ft. centers, which in



Conveyors to the sizing screens and sand bin



Truck discharging gravel to the primary crusher



An oscillating feeder regulates flow of stone to scalping screen



All material passes through scrubber in center and sand goes to washer on right

turn discharges over a Robins Gyrex 48-x 102-in., single-deck vibrating screen. The oversize from this screen is chuted to a Traylor 3-ft. TY gyratory crusher to be reduced in size according to any particular requirement. The throughs from this crusher are transferred over a 24-in. belt conveyor, 74-ft. centers, back to join the stream of material on the conveyor from the primary crusher, and passes over the single-deck screen again.

Washing and Screening

All gravel must pass this screen before going on for further sizing and



Primary jaw crusher

washing. The throughs are flumed to a Traylor 6-ft. rotary scrubber where wash water is applied. After going through the scrubber, all stone goes over a Robins 48-in. by 14-ft. double-deck vibrating, dewatering screen, where water under pressure is applied to the gravel as it passes over the screen. The top deck serves to prevent undue wear and strain on the fine sand screen surface below.

Throughs from the sand screen pass direct to a Dorco 12-ft. diameter washer which has a rated capacity of 120 tons of concrete sand per hour. Sand from the classifier is carried over a belt conveyor, 193-ft. centers, to a 150-ton sand bin separate and distinct from the gravel bins. When the bin is full, the conveyor can discharge direct to open storage adjacent to the sand bin.

Gravel retained on the vibrating screen is carried over a 24-in. belt conveyor, 158-ft. centers, direct to a Traylor 5-x 17-ft. revolving screen above the gravel bins. Four sizes of gravel are produced. Seven bins are provided, with a combined capacity of 700 tons of

gravel. Blending is done by loading cars with intersecting chutes from various bins.

Wash water for the plant is furnished by two 5-in. Morris pumps and is applied in the scrubber and at the vibrating and revolving screens. An interesting feature of the plant is the method of handling the waste water. Water from the revolving sizing screen is flumed back into the overflow of the washer, the water from both sources going directly into the intake of a Morris 5-in. sand pump. The pump discharges to a settling basin, and the



Screen for sizing chips

clarified water returns to the original pool for re-use.

Stone Chips

Going back to the primary crusher, the making of chips is a distinct operation of its own. Selected large stone may be run simultaneously with the regular



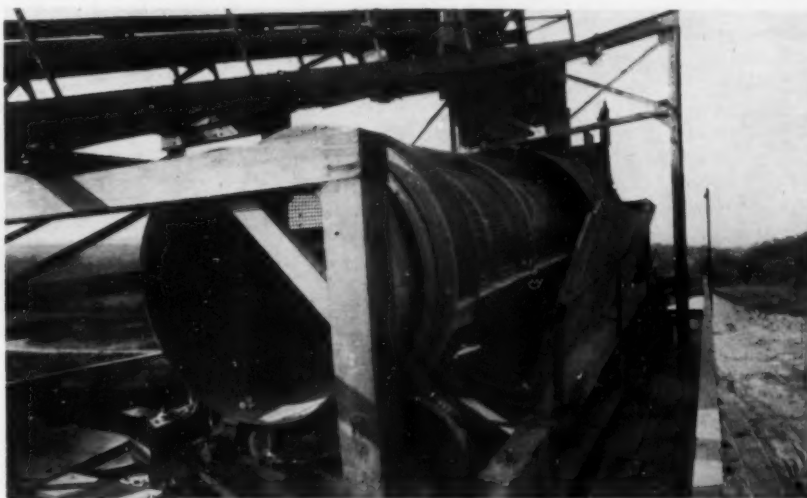
Crusher to reduce oversize gravel

product run, but is generally put through the plant independently. After passing the primary breaker, the stone is carried over a 24-in. belt conveyor, 104-ft. centers, parallel to the regularly used conveyor. This second conveyor transfers to another 24-in. belt conveyor, 74-ft. centers, at right angles, which discharges the stone to open storage over a reclaiming tunnel.

Then chip sizes can be made when



Gravel screening plant and storage bins



Gravel is sized through a rotary screen



Gravel from scrubber is washed, over a vibrating screen



Left conveyor goes to sizing screens. The right-hand conveyor carries sand to storage

the regular gravel and sand production is curtailed and without operating the primary crusher or the shovels in the pit. Stone is reclaimed from storage over a belt conveyor identical in size and length with the one which placed the stone in storage, and passes over the single-deck screen preceding the reduction crusher. The 158-ft. centers gravel conveyor discharges this stone over a single-deck Robins vibrating screen, where chips ($\frac{3}{16}$ - to $\frac{3}{8}$ -in.) are removed and passed to storage. The throughs go to a 4-ft. Allen cone where sand is recovered and discharged to a bin below.

About 500 hp. in electric motors are required to operate the entire plant. Belt conveyors throughout are Robins Conveying Belt Co. make, and belting is made by the Cincinnati Rubber Co.

Operating Profit?

SOUTH DAKOTA STATE CEMENT, Rapid City, S. D., had an alleged operating profit of \$137,071 during the first six months of 1937, according to the semi-annual report of the cement plant commission filed recently with the secretary of state. Gross sales for the period totaled \$635,220. Freight allowances and other discounts reduced this figure to \$412,313. Manufacturing costs and purchases amounted to \$228,494, packing and loading expenses were reported at \$30,610, sales expense was fixed at \$14,920 and general administrative expenses were \$3757. These figures include no charge for taxes, that privately-owned producers pay, and no return on the public money invested.

Fatal Electrical Accident

SOUTHERN STATES PORTLAND CEMENT Co., Rockmart, Ga., suffered a fatal accident to its chief electrician, Tom P. Clements, recently when he touched a live electric wire and was hurled 20 ft. to the ground. Mr. Clements had been with the concern for 20 years.

Large Stock on Hand

PEERLESS CEMENT Co., Port Huron, Mich. plant, was closed recently for an indefinite period since orders were not sufficient to keep the plant in operation. Some of the men will be employed during the shutdown period on repairs and improvements. The plant has been operating since May 1, and now has 100,000 bbl. of cement in storage.

Three Injured By Blast

PENNINGTON TRAP ROCK Co., Pennington, N. J., was unfortunate in having three employees suffer painful injuries on August 4 when a charge of dynamite exploded prematurely. Three sticks of dynamite already placed in a blast hole exploded while more dynamite was being placed. According to M. H. Hausman, manager of the company, no reason for the explosion could be given, since the dynamite had not been equipped for firing.

Again in Operation

LEHIGH PORTLAND CEMENT Co., Oglesby, Ill. plant, resumed operations recently after a shutdown of three weeks. During that period 200 employees were given a week's vacation with pay.

Cement Investigation

STATE OF TEXAS, through a legislative committee, is investigating prices and quality of Mexican cements made by foreign corporations as compared to those for Texas cements. The committee was appointed to investigate charges that Texas spends too much money for cement for its public works.

Large Cement Order

SUPERIOR PORTLAND CEMENT, INC., Seattle, Wash., has the contract to furnish between 275,000 and 300,000 bbl. of cement for use in construction of Ruby Dam, a power project on the Skagit above Diablo dam. The bid price was \$529,000.60.

Quarry Opening Restrained

BROWN PAVING Co., Ashville, N. C., has been permanently restrained by the local county court, from opening a quarry and operating a crushing plant in the Arco Gardens development area. The company will appeal the decision.

Rock Asphalt Shipments Increase

UVALDE ROCK ASPHALT Co., San Antonio, Texas, is enjoying a steady gain in shipments from its Blewett, Texas mines. Shipments are averaging about 60 cars per month, with a high of 160 cars for the month of April.

Increases Fleet

WOLVERINE PORTLAND CEMENT Co., Coldwater, Mich., has purchased two new steel barges for use at its Quincy plant, where marl is the raw material. The company now owns a fleet of 25 boats and barges.

Adds Crushed Stone

JOHN E. REDMAN SAND AND GRAVEL CORP., Rochester, N. Y., is opening a ledge of limestone that runs through its gravel deposit and will put stone through the plant as well as sand and gravel. Additional equipment will be added. The plant is perhaps unique in being able to produce washed and screened sand and gravel, or crushed limestone, on demand.

Shortage of Cement in Germany?

GERMANY's output of cement in the first half of 1937 was 5,010,000 tons, a figure not sufficient to supply the demand.

Quarrying Again

THE FRANCE STONE Co., quarry at Bloomville, Ohio resumed operations recently after suspending operations for four weeks due to flood waters in the quarry. Five pumps were in continuous operation for about a month to rid the quarry of water.

Dust Suit Hearing

COWELL PORTLAND CEMENT Co., San Francisco, Calif., and its manager Earl D. Barnett were recently cited by the district attorney to show cause why contempt proceedings should not be instituted against them for alleged failure to comply with a court order for elimination of dust in the manufacture of cement at the plant at Cowell, Calif. Farmers claimed that the company has failed to use its dust arresting equipment.

ROCK PRODUCTS

Agstone Producers Exhibit at State Fair

THE MIDWEST AGRICULTURAL LIMESTONE INSTITUTE, an organization comprising Illinois agstone producers and others from Indiana and Missouri serving the Illinois market, held a very successful co-operative exhibit at the Illinois State Fair at Springfield, Ill., August 14-22. The exhibit was the outcome of a suggestion by one of the producers at the Chicago meeting in January, who thought that such a display would be a good advertising supplement for agricultural stone.

The exhibit was such a success, both from the standpoint of renewing acquaintances and in sales closed at the exhibit, that plans are in progress for a more extensive and comprehensive exhibit at the next Fair.

The institute was fortunate in securing the services of Charles R. Hutcheson, editor, *Modern Agriculture*, Waterloo, Iowa. Mr. Hutcheson, better known as "Alfalfa Hutch," from his station at the head end of the exhibit tent, advised farmers on their alfalfa and legume problems. Salesman representing co-operating producers attended and talked to farmers who visited the exhibit.

The climax of the week was the first annual Limestone Producers' Reunion on Thursday, August 19, when a chicken dinner was served country style at a well-known Springfield roadhouse. Among the guests in attendance were: J. R. Boyd, administrative director, National Crushed Stone Association; A. T. Goldbeck, engineering director, National Crushed Stone Association; W. H. Voskuill, Illinois State Geological Survey; "Alfalfa Hutch"; and J. R. Spencer, director, Soil Improvement Department, Illinois Agricultural Association. The following member concerns cooperated in the exhibit:

Anna Quarries, Inc., Anna, Ill.
Columbia Quarry Co., St. Louis, Mo.
Consumers Co., Chicago, Ill.
Dolese & Shepard Co., Chicago, Ill.
Elmhurst-Chicago Stone Co., Elmhurst, Ill.
E. St. Louis Stone Co., E. St. Louis, Ill.
Lehigh Stone Co., Kankakee, Ill.
Lincoln Crushed Stone Co., Joliet, Ill.
Midwest Rock Products Corp., Greencastle, Ind.
Mississippi Lime Co., Alton, Ill.
Moulding-Brownell Corp., Chicago.
National Stone Co., Joliet, Ill.
Newton County Stone Co., Kentland, Ind.
Ohio & Indiana Stone Co., Indianapolis, Ind.



"Alfalfa Hutch," left, discussing farmers' problems in the limestone producers' exhibit tent

Pontiac Stone Co., Pontiac, Ill.

Other concerns participating were the Urbana Laboratories, Urbana, Ill., makers of "Rich-or-Poor" soil testing fluid and Peoria Steel and Wire Co., Peoria, Ill., manufacturer of Paramount limestone spreaders.

July Statistics

PORTLAND CEMENT INDUSTRY in July, 1937, produced 11,597,000 bbl., shipped 12,237,000, and had in stock at the end of the month 23,371,000. Production in July, 1937, showed an increase of 0.8% and shipments an increase of 3.5% compared with July, 1936. Stocks at mills were 23.2% higher than a year ago. The statistics here given are compiled from reports received by the Bureau of Mines for all manufacturing plants.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 160 plants at the close of July, 1936, and 1937.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	July 1936	July 1937	June 1937	May 1937	April 1937
The month...	51.3	53.1	52.8	53.2	48.8
The 12 months ended.....	34.0	47.8	47.8	47.9	47.6

Damaged by Fire

FAY MASSEY gravel plant, near Indio, Calif., was damaged to the extent of \$500 by fire of undetermined origin on August 10.

To Double Capacity

CASEY LIME AND STONE CO., Casey, Ill., has stopped operations for six weeks in order to double its present capacity to meet demands. About \$10,000 will be expended for a new 75-hp. steam engine and boiler and a crusher.

Opening Gravel Pits

CONCHO SAND AND GRAVEL CO., Oklahoma City, Okla., recently began operations at its Granite, Okla. gravel deposits to furnish aggregates for highway construction.

Still Actively in Business

COOGAN GRAVEL CO., Peoria, Ill., has not gone out of business, as might be implied from the news-item published in the August issue of *Rock Products*, page 61, advising of the dissolution of the company. The articles of dissolution were filed by the Coogan Gravel Co., Inc., and the concern is now actively operating as the Coogan Gravel Co.

Open Quarry After 70 Years

ROCKFORD STONE QUARRY, Florence, Nebr., is to be under operation soon after being idle since 1867. Mrs. C. Petersen, owner, of Omaha, has leased the quarry to a Kansas City construction company for five years.



Improved plant of Ottawa Silica Corp. at Ottawa, Ill.

IMPROVED SILICA FLOUR

Through
Double Washing,
Dust Collection

AN INCREASED CAPACITY both in sand and silica flour; double washing of silica as it comes from the pit, making a far superior product; and greater perfection in its dust-collection system are three forward steps taken by the Standard Silica Corp., Ottawa, Ill., this past year.

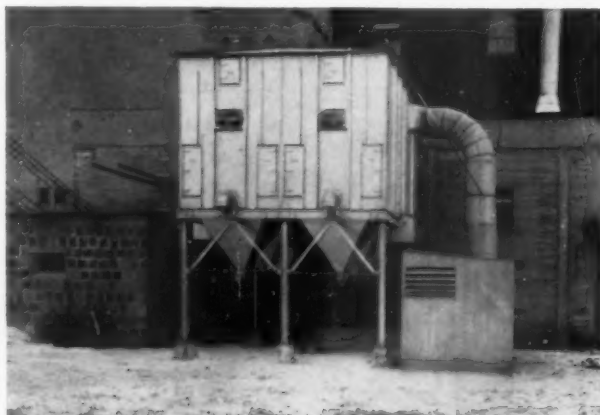
The installation of a second 40-ton washer has served the double purpose of giving a purer final product and increasing the silica output of the plant, because more clay impurities are eliminated than before in washing. After passing the first washer, the silica goes by gravity feed to the second washer before going to the drain bins. Before this practice the clay content had been instrumental in arching of the material in the dryer and binding on the steam pipes. This has been eliminated with the reduction in impurities. A shorter time in the drain bins as well as in the dryer is needed since this installation was made. Nine 85-ton drain bins are filled

in a day where eight was the maximum with one washer. Water for both washers is supplied by one 10-in. pump, at 175 p.s.i.

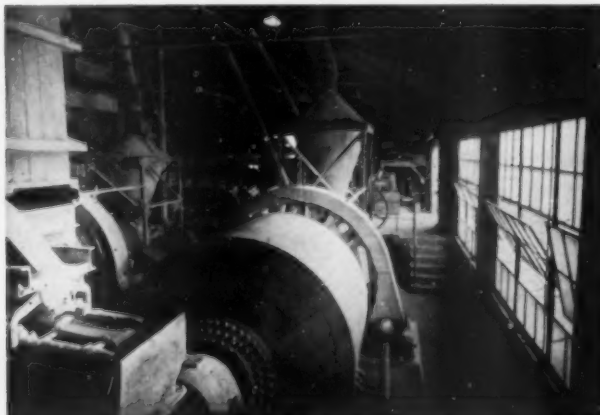
Capacity of the silica flour mill has been more than doubled by the installation of a second 8x10-ft. Hardinge peb-

**Standard Silica Corporation,
Ottawa, Illinois**

Dust from the ten totally - enclosed vibrating screens, the dryer room, the loading bins, the storage bins and elevators is collected in one large bag-type dust collector



BELOW, LEFT—The sizing screens are totally-enclosed, dust being taken from the bottom as well as the top of each. **RIGHT**—Silica flour capacity has been more than doubled since installation of this new mill. Note the feeder on the left



ble mill used in grinding up to 325-mesh fineness. The mill is V-belt driven by a 75-hp. G.-E. motor, and air for classification comes from a Clarage fan at 3600 r.p.m. The mill averages about 1½ tons of 140-mesh product per hour. Storage of the fine product is still 120 tons, which is bagged by a Bates bagger. When production exceeds shipments markedly, the product is bagged out and stored.

Dust Collection

The dust-collecting system in the mill room was greatly improved by a second Blaw-Knox collector of the bag type. Connections are such that dust from both flour mills is collected in either of the two collectors, and can be diverted to the second one while the dust is being beaten out of the other. Dust recovered is stored in the regular flour storage bin.

A large Blaw-Knox, bag-type dust collector unit has been installed also to gather dust from all sources in the screen house. Each of the ten Tyler "Hum-mer" vibrating screens is totally enclosed and dust is drawn from the bottom and the top of each screen to this collector. This same unit gathers dust from the dryer room, from the loading bins, the storage bins, all elevators and from all points where dust may be generated in dropping to conveyor belts or elevators.

Rock Wool

STATE GEOLOGICAL SURVEY OF KANSAS has published as a Bulletin of the University of Kansas, No. 5, Volume 38, March 1, 1937, a report "Rock Wool Resources of Kansas," by Norman Plummer, which proves a helpful addition to the literature on rock wool. This report is designed to show that "the resources of Kansas in raw materials suitable for making rock wool are practically unlimited. Some of the raw material is wool rock, which can be mined, melted and blown without any addition of other material. Most of the Kansas raw material, however, must be mixed before melting." The state also has large resources in natural gas, which can be used as a cheap fuel. The report contains sketches of limestone and shale exposure profiles, which will prove very helpful to the average quarry man, or amateur geologist in identifying the various strata.

Road Show to be Held in Cleveland

THE AMERICAN ROAD BUILDERS ASSOCIATION will hold its 1938 convention and road show in Cleveland January 17-21, 1938. It is expected that about 250,000 sq. ft. of floor space at Public Hall will be allotted for the show.

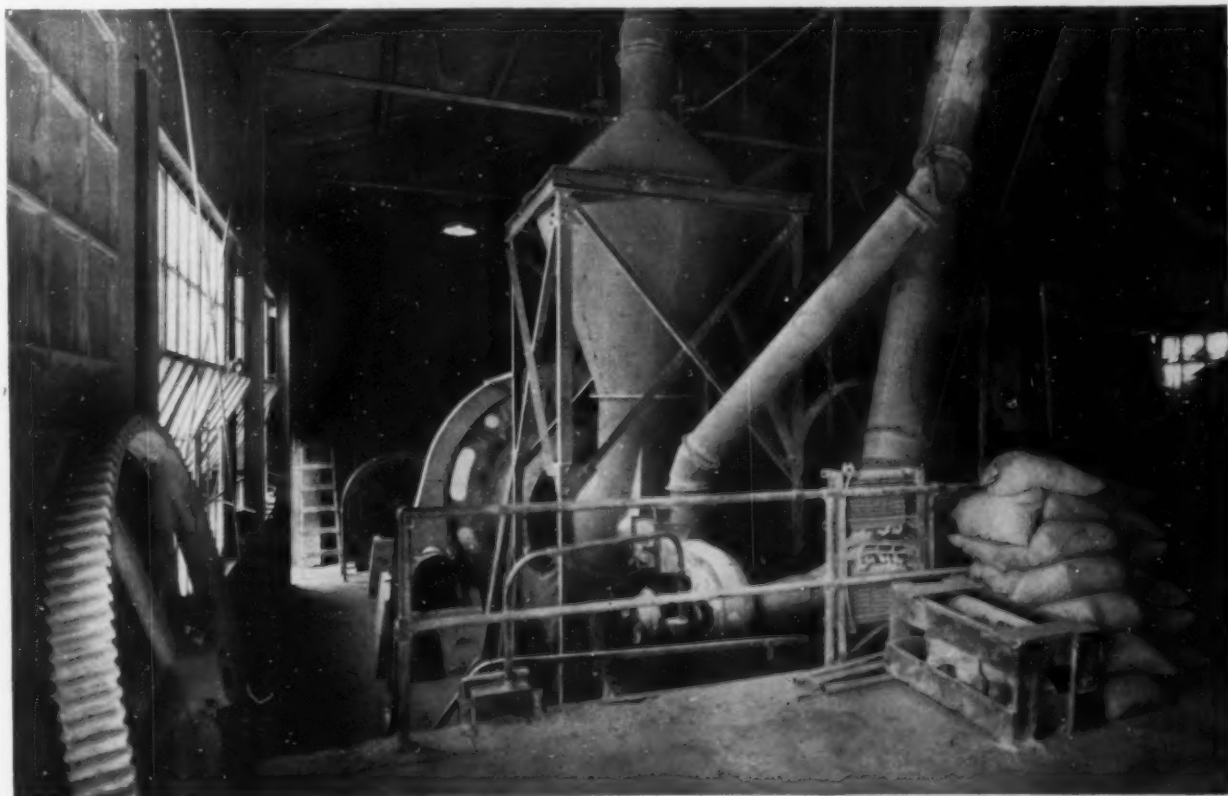
Whiting

U. S. BUREAU OF MINES has published as Bulletin 395: "Occurrence, Properties, and Preparation of Limestone and Chalk for Whiting," by Hewitt Wilson and Kenneth G. Skinner. The authors say that due largely to improvements in grinding and classification by American manufacturers, domestic whiting prepared from native limestones have largely replaced the imported material during the last few years. The report is quite complete (160 pp.) and an idea of its contents may be gathered from a summary of chapter headings: Occurrence, description and origin of chalk and limestone deposits; laboratory tests of whiting; use of whiting in putty; putty tests; use of whiting in paint; decoloration of chalk; description of chalk, limestone and marble samples by states. The report is illustrated by photomicrographs of chalk and limestone particles. Copies can be obtained from the Superintendent of Documents, Washington, D. C., for 30c each.

To Make Agstone

BUCHANAN STONE Co., Clarksville, Tenn., is operating a large crusher driven by a 100-hp. Diesel engine to produce 150 tons of agricultural limestone daily.

Discharge end of new pebble mill for grinding silica flour. Note classifier in center



Cement Industry Studies Worker Health

Twenty Years of Research and Observation Prove There
Are No Physical Hazards Inherent to Cement
Manufacture

(An interview with A. J. R. Curtis, Secretary of the Committee on Accident Prevention
and Insurance of the Portland Cement Association, by the editor of Rock Products.)

IN AN ERA of precarious occupational disease litigation and legislation, with actual health conditions among the workers so often an unknown quantity, it was refreshing to drop into the general offices of the Portland Cement Association a short time ago and to find there a comprehensive source of exact information on worker health in the cement industry. Little has been left to surmise. At the conclusion of an interview, few if any of our searching questions had been left unanswered.

PCA uses the best medical and scientific talent as well as a wide variety of methods in its health researches, which are being driven along rapidly to the point of conclusion. Starting twenty years ago with observations and fragmentary studies by leading specialists of that day, continuing with the interpretation of parallel work in other industries and other countries, interest in the health of cement workers finally led to an elaborate study in one cement mill by the U. S. Public Health Service in 1924, and a dozen studies of similar character by the Saranac Laboratory and cooperating agencies for the Portland Cement Association in 1936 and 1937.

Painstaking engineering, chemical and petrographic measurements, conducted by Saranac technicians, have revealed the character as well as the concentrations of the mill and quarry dusts in typical plants throughout the United States. Physical and x-ray examinations of thousands of mill and quarry workers; recurrent examinations of many; comparative physical studies of control groups consisting of persons not employed in cement manufacture; researches into the vital statistics of mill communities and studies of involuntary absenteeism by workers are examples of the many methods and techniques employed in measuring worker health.

All of this work of careful appraisal and measurement has been guided during recent years by the Association's control group, known as the Subcommittee on Dust Problems of which

Editor's Note

WHILE on an inspection trip through a cement mill, a veteran cement worker recently assured the editor of Rock Products that cement dust was not at all injurious to health. When asked "why" he replied: "Our dust is cooked. It doesn't have any germs."

Cement dust is not only sterile but as the accompanying facts so plainly indicate, the dusts encountered in cement manufacture are also quite incapable of injurious chemical reactions with the body solutions and several of them are quite generally considered to have curative effects.

The cement industry studied dust and health for over twenty years, then frankly discussed these subjects with its workers. In the accompanying interview with Mr. Curtis, the editor presents the more important findings of recent researches by the Portland Cement Association, a remarkable series of studies in industrial health.

—EDITOR

Gordon C. Huth of the Universal Atlas Cement Co. is chairman, and which operates as a section of the Committee on Accident Prevention. General supervision of plans, working schedules, field work, analyses and reports rests with A. J. R. Curtis, at association headquarters, from which point is operated a dispatching and reporting system that makes even the most recent information immediately available wherever required.

Tuberculosis

I had heard that tuberculosis of the respiratory system was a good general index of worker health, so, opened the interview with Mr. Curtis with an in-

quiry as to the status of the cement industry as regards the presence of this disease. The figures presented are not only enlightening but they are conclusive and convincing.

Healed lesions of tuberculous origin, of the adult type, were found in between 4 and 5 percent of the 566 pairs of lungs reported to date in the current studies of cement workers; only 4 cases of active tuberculosis were discovered in this entire group, indicating a really remarkable freedom from this disease. Two of the three mills in which these particular studies were made presented no cases of active tuberculosis whatever.

The significance of these figures is better understood when it is known that in groups where silicosis is discovered the proportion of active and inactive tuberculosis is usually 20 percent or more. It may be stated confidently that tuberculosis in the cement mills studied is no more common than in the general population and much less frequent than in many industrial communities.

Of particular interest is the tuberculosis death rate, comparing cement plant workers with other classes of labor and with the male population in general. The death rate from tuberculosis per 100,000 gainfully occupied male persons between the ages of 15 to 64 years of age, has been found as follows (data provided by National Tuberculosis Association except for cement workers, which is based on all available insurance figures in the cement industry):

Tuberculosis deaths per 100,000 persons:

Cement mill and quarry workers.	42.58
Foremen and skilled industrial workers in general.....	74.20
Semi-skilled workers in general	98.20
Unskilled workers in general...	183.10
All males 15-64 years.....	91.40

Equally convincing was a parallel statement relating to diseases of the heart:

Deaths per 100,000 persons due to heart ailments:

Cement mill and quarry workers	146.10
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Foremen and skilled industrial workers, in general.....176.20
Semi-skilled workers, in general.168.10
Unskilled workers, in general...242.50
All males 15-64 years.....159.70

The corresponding information covering deaths from cancer and other malignant tumors is also impressive:

Cancer deaths per 100,000 persons:
Cement mill and quarry workers 57.39
Foremen and skilled workers, in general 90.90
Semi-skilled workers, in general 75.20
Unskilled workers, in general..106.70
All males 15-64 years..... 65.90

Early Investigators

A brief account of the findings of a few of the more eminent investigators into the health of cement workers may be repeated here as a matter of interesting history. Twenty-five years ago the chief factory inspector for Great Britain stated in his annual report:

Careful inquiry has been made as to the effects of dust on the health of the cement workers (of Great Britain). Sick clubs exist in a number of the factories and particulars as to mortality, invalidity and sick pay appear to show that the trade is on the whole a healthy one. Deaths are few, absences from work rare and generally due to influenza, colds or accidents, and sick pay is small. There is often more invalidity among the workers in non-dusty processes than in the dusty occupations of kiln drawing, mill and packing.

In 1913 and 1914, Dr. George E. Tucker, as a representative of the medical profession, was requested by the legislature, state board of health, and cement manufacturers, to conduct conclusive investigations of health conditions in the cement mills of southern California and to report back to the legislative committee and the state board.

Dr. Tucker's report was based on the examination of a large number of men in all of the plants in this district, public hospital records and a review of available literature. In the Riverside plant alone, Dr. Tucker examined 956 employees and several hundred applicants for employment. The evidence did not support the claim that cement workers are prone to pulmonary diseases and affections of the eyes, nose and throat, but on the contrary these diseases, which one might presume would be present among men engaged in dusty occupations, were much less prevalent among cement workers than among men engaged in industries where there is no exposure to dust.

Frederick L. Hoffman, statistician for the Prudential Life Insurance Co., writing to Dr. W. F. Snow, former secretary of the California State Board of Health, about the same time, says:

The evidence of medical men and others is generally negative. Pulmonary complaints, phthisis and asthma, appear to be conspicuously absent. There is no evidence of life being shortened, but on the con-

trary, the longevity of cement workers is remarkable, men being frequently found at work at the age of 60 years and upwards.

Sir Thomas Oliver, leading British physician and scientist, after a long and wide experience among workers in cement, made the following observations in the course of his remarks at the National Safety Congress in 1923:

Although cement making is a dusty occupation, the workers are remarkably free from any lung trouble, and that obtains not only in this country in the cement factories that I have visited, but also in Europe, and in those which I have seen in England.

I don't see that there is anything in cement making that brings it under the category of dangerous trades, nor do I find that in cement making there is anything that can be called an industrial disease. On the whole, the longevity of the cement maker is quite equal to that of the average of other people.



Gordon C. Huth

Cement Association Studies

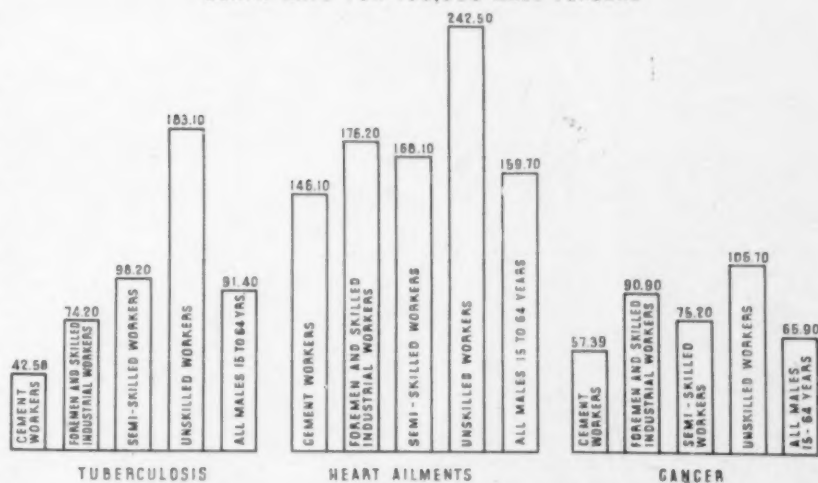
A few years ago, when a plague of occupational disease suits fell upon the land, centering principally in alleged lung disability claimed to arise out of employment in dusty industries, the Portland Cement Association decided to study with scientific thoroughness and precision, the nature of its dusts from the health point of view; also by careful examination of a sufficient proportion of the working force, to determine health conditions and the effects, if any, of the customary dusty working environment.

The Saranac Laboratories, research unit of the Trudeau Tuberculosis Institution at Saranac Lake, N. Y., one of the most renowned tuberculosis and dust disease institutions in America, was engaged to conduct the study with the assistance of a number of other distinguished institutions and scientists. After months of research by the Portland Cement Association's sub-committee on dust problems, in which a large number of petrographic studies were made and the age and other characteristics of plants and workers were tabulated, a number of plants were selected for study, suitability being determined by the following points:

- (1) Geographical location.
- (2) Average age and tenure of service of workers.
- (3) Length of time plant was operated.
- (4) Relative dustiness of plant.

The first plant studied is one of the older plants located in the Lehigh Valley and is typical of average plant conditions there over a long period. The working force is older than usual, about one-third their number being over 50 years of age and about one-half being over 40 years of age. The oldest worker

DEATH RATE PER 100,000 MALE PERSONS



Death rate of cement plant workers as compared to that for other classes of labor and the male population in general, considering three common causes of death

is a hale and hearty old man of 78. The longest term of cement plant service is 44 years, which coincides with the start of the portland cement industry in America. It is doubtful if more than one other cement mill in the United States can compare with the mill mentioned in respect to worker age and length of cement mill employment.

Resumé of Lehigh Valley Results

The report of Dr. L. U. Gardner, director of the Saranac Laboratory, shows a remarkably fine condition with respect to the lungs of a working force of 201 men. The oldest worker (referred to above), who has been employed for 34 years in the dustier locations in the raw mill and in the packing department, points where dust concentrations are highest, showed no lung changes whatsoever. The worker referred to above as having a cement mill experience of 44 years was 67 years of age; his lungs showing less linear markings than those of a recently hired 20-year old boy.

After carefully considering data revealed by complete physical and stereoscopic x-ray examinations with occupational histories of the men, Dr. Gardner rendered the following conclusions:

The data from both the medical and the engineering reports indicate clearly that there is no silica hazard in this plant.

Dust counts have failed to demonstrate enough silica in the atmosphere to produce silicosis or any disabling pneumoconiosis.

While a petrographic and chemical analysis of the raw rock revealed a maximum of 6 percent of free silica, dust from this material suspended in the atmosphere contained only 2 percent silica. Dust settled on rafters from the same atmosphere contained 10 percent silica, more than was present in the original material. This effect of selective settling of silica resulting in abnormal concentrations upon the rafters is in accord with observations that we have made elsewhere and that Hatch and Moke have described in foundries. (*Jl. Ind. Hyg., 1935*)

Not only has there been nothing to indicate a silica hazard, but it could not be demonstrated that the non-siliceous dust had any grave effects upon the men employed in the industry. The lungs of 78.6 percent of the entire group of 201 showed no change that could be attributable to inhaled dust; in 17.9 percent there were slight exaggerations of the linear lung markings which could not be correlated with particularly heavy or particularly long exposures to dust. Since such changes can be produced by causes other than the inhalation of dust it is not justifiable to attribute them to the dust in this plant. The same is true of the 7 cases showing a more marked exaggeration of the linear markings in the lung.

Second Study in the South

The second plant selected for study was likewise very significant because it is typical of the plants located in the central South; plants and men are younger than in "the Valley." Raw materials vary, men have a different racial strain and living environment and negroes, known to be much more prone to lung troubles, were present in the

second group. But Dr. Gardner says in his conclusions regarding this study:

Data from both the medical and engineering reports indicate that there is no silicosis hazard in the mill or quarry of the plant studied in the Alabama district.

Finished cement dust in this plant has failed to cause significant reaction in the lungs.

Lung reactions possibly due to dust were surprisingly few in number. Only five cases showed a marked exaggeration of the linear markings in the lung. These cases amounting to 2.4 percent of the entire group, as well as the group of 13 percent which showed a slight exaggeration of linear markings, could not be correlated with long or specific exposure to dust in this plant.

No cases of active tuberculous infection were discovered, and although 18 percent of the group examined were negroes, the incidence of old healed tuberculosis of the adult type so nearly approximated the average as to be of no practical significance. None of the tuberculous lesions was active and none produced any clinical symptoms or required medical attention. Active tuberculosis is one of the chief indices of silicosis.

The physical examination disclosed only the usual number of abnormalities and defects that are regularly encountered in examining men of this age and economic status.

So the second plant group studied revealed nothing further of particular interest with respect to lung conditions except that there was an entire absence of active tuberculosis. These first two studies were similar in this respect: The amount of free silica present in both cases was too low to have any medical significance. The third study, however, unexpectedly uncovered a raw material (shale) containing a considerable amount of free silica. The proportion of free silica was greater than had been encountered in any of the sixty plants from which preliminary samples were secured and the amount seemed sufficient to have constituted a probable hazard except for the presence of greater quantities of harmless (or beneficial) neutralizing dust mostly of clay and limestone origin.

Notwithstanding the actual presence of silica the results of the physical examinations of exposed workers were spectacular: Worker health and physical condition were definitely better than in the first two plant groups studied. Individuals with long service records in the dustier departments were as free from signs of physical impairment as were those who had worked for shorter periods in cleaner surroundings. In his conclusions on this study, which was made in the Kansas-Oklahoma area, Dr. Gardner says:

Conclusions of Western Study

In spite of the fact that the dust concentrations in this plant were high, the incidence of pulmonary reaction that could be attributed to its inhalation was extremely low. A shale which constituted one of the raw materials showed relatively large amounts of free silica, yet evidence of silicosis was entirely lacking. Apparently the silica was either too coarse or it was combined with other substances in such a way that inhalation of effective quantities did not occur.

The data collected does not substantiate the belief that the inhalation of high concentrations of dust of any type favors the development of infection. The incidence of tuberculous and non-tuberculous infections in this group was not unusual and the cases which were discovered were all in a healed or quiescent stage.

There was nothing to suggest that these healed infections influenced response of the lungs to subsequently inhaled cement dust. Evidence of pneumoconiosis was no more marked in these cases than in the rest of the series.

This study furnished very conclusive evidence of the innocuous nature of finished cement dust. Long exposures to high concentrations have invariably produced no demonstrable reaction in the lungs. In the packhouse there were 11 men working from 8 to 26 years (5 of them for more than 10 years); all had negative chest roentgenograms.

The use of shales containing from 30 to 40 percent free silica as one of the ingredients, suggested a silica hazard in the raw mill. However, examination of the employees failed to reveal a single case of silicosis.

The explanation is not easy to discover. It is apparently not due to insufficient duration of exposure as many of the men had worked for some time in the raw mill. The question now arises as to why no silicosis did develop.

The lack of significant reaction to such quantities of fine quartz dust in the recorded periods of time is probably due to the particles of clay that are associated with the silica. The clay was present in an extremely fine state of sub-division as observed in the separation of the sample of air-floated dust. These fine argillaceous particles were closely adherent to the surface of every spicule of quartz. The size of the aggregates as they existed in the atmosphere could not be determined with the apparatus available. Many of them may have been too large to remain in atmospheric suspension or at least to penetrate the protective mechanisms of the upper respiratory tract. It is also possible that a coating of silica particles by a layer of finer material of different composition may inhibit its activity. The exact nature of such inhibitory effects awaits demonstration but it is nevertheless very real. The Saranac Laboratory has observed it in other mixtures of silica and various non-siliceous substances and Middleton called attention to the protective action of clay in 1930.

Results of these three studies not only provide far more information on the health of workers in the cement industry, particularly from the standpoint of respiratory disease, than was available heretofore, but it is probable that they come very near to furnishing a complete picture in so far as possibilities of respiratory disease of any kind is concerned. Cement mill and quarry dusts very seldom contain enough free silica to permit a suspicion of dusty lung conditions (pneumoconiosis). Where silica is present in appreciable amounts (very rarely) composition of the finished product always requires the grinding of greater quantities of such well known counter-active or neutralizing dusts as calcium carbonate (limestone) and clay. The conclusion of the Portland Cement Association's studies in some eight or nine additional plants cannot be anticipated, of course, but it is likely that their greatest significance will be in giving wider geographical approval to the principal conclusions of the first three studies.

Cement Dust Harmless

The question of whether or not finished cement dust is harmful to health has come up so often that a short explanation will be of interest. The only disabling pneumoconioses (dusty lung conditions) are those known as silicosis, asbestosis and anthrosilicosis due to the inhalation of large quantities (respectively) of free silica, asbestos and anthracite coal over long periods.

Cement dust is not hazardous because it contains no free silica, contrary to a mistaken although fairly common belief often due to the chemists' methods of reporting all silicon compounds in cement as "silicon dioxide," although they are not present in that form but as the harmless compounds, tricalcium silicate and dicalcium silicate. There is, of course, no asbestos or anthracite coal in cement.

Comment in Dr. Gardner's Annual Report

Remarks on the subject of the research work on cement mill employees, contained in the annual report for 1936 by the director of the Saranac Laboratory, are as follows:

A third study is being made in the cement industry. Although there is no theoretical hazard from silica in the manufacture of this product, a good deal of dust is produced. In spite of the negative chest findings in the survey made by the United States Public Health Service, the Cement Association, which has high ideals for the health and safety of men employed by its member companies, asked the Saranac Laboratory to survey more of its plants. Three of them, located in Pennsylvania, Alabama, and Kansas, have now been studied. The men were examined either by local physicians or by the clinical consultant to the Laboratory. Stereoscopic roentgenograms of the chest were made and interpreted by the department at Trudeau. Laboratory engineers made surveys of the concentration and character of the dust in the plants. The data from the last plant has not yet been compiled; the positive findings at the others were surprisingly meager.

No pulmonary changes are visible after prolonged inhalation of finished cement dust. A few of the men show an increase in the linear markings of the lungs but the incidence of this change cannot be correlated with the intensity or duration of the exposure. The same can be said of the inhalation of the raw materials, limestone and clay, of which cement is made. Tuberculosis is not influenced by the inhalation of cement dust; the frequency of healed lesions has been the same as that in the general population. Complaints referable to infection of the upper respiratory tract have been relatively uncommon in the men thus far examined. Final conclusions as to the influence of cement dust will only be drawn after analyzing the findings from widely scattered plants; at the present time it hardly appears that evidence of serious injury will be discovered.

Adds Ready-Mix

ARKHOLA SAND AND GRAVEL CO., Fort Smith, Ark., now is prepared to render a ready-mixed concrete service to contractors and builders. Shipments are made in 1½-yd. transit mixers.

To Help Prevent Silicosis

TO COMBAT silicosis, which has been receiving so much attention recently from health officials, insurance companies, and employers, United States Rubber Products, Inc., New York, N. Y., has designed new blower and dust suction hoses to meet practically every known conveying condition.

Dust hose—Official P-5508 (for abrasives)—is designed for either suction or light pressure, such as that generated by a blower. It is claimed to successfully withstand the abrasive action set up in the conveyance of various types of particles. The carcass of the hose is supported by a steel wire helix and is as light as is consistent with long-wearing qualities. It is finished with outside corrugations to lend flexibility and is available in three thicknesses of pure gum tube. The thickness is dependent upon the abrasive nature of the material being conveyed. Dust conveying hose is made in sizes of 2, 3, 4, 5, 6, 8, 10, and 12 in.

Blower hose (for fumes only)—Official P-5509 — is similar to the dust conveying hose with respect to carcass construction and wire reinforcement. Because it is offered for blowing service where mainly fumes or gases are conducted and is not designed for conducting abrasives, a lighter construction and a compounded tube are employed. Sizes range from 2 to 12 in.

Two Big Contracts

LYMAN-RICHEY SAND AND GRAVEL CORP., Columbus, Neb. plant, is shipping about 85,000 tons of gravel for highway construction and has a 350 carload order of gravel to go into oil matting near David City.

Service—For 25 Years

MACWHYTE CO., Kenosha, Wis., recently celebrated its 25th anniversary, and commemorating the event was a special edition of the *Kenosha Evening News*. Picture pages graphically portrayed the precision methods employed by the company in the manufacture of high-grade wire, wire rope, braided wire rope slings and cable and tie rods for aircraft.

The important part that laboratory research has played was also stressed. While celebrating its silver jubilee in Kenosha, the foundation for the present business was actually laid back in 1896 when George S. Whyte incorporated to sell wire rope on a brokerage basis. In 1901 Mr. Whyte put into effect some of his ideas for the improvement of wire rope and first began manufacturing operations.

This first plant was erected in Coal City, Ill., with executive offices in Chicago. The company was known then as the Macomber & Whyte Rope Co. The entire business moved to Kenosha in 1902, and in 1920 the corporate name was changed to the Macwhyte Co.

As an example of the service given by Macwhyte distributors the Fabick Tractor Co., Memphis, Tenn., recently sent one of their trucks on a 600-mile trip to Kenosha in order to get a quick delivery for a wire rope customer. The illustration herewith shows 52,535 ft. of rope loaded for Memphis.

Company Wins Silicosis Suit

NEW JERSEY PULVERIZING CO., New York City, with a silica grinding plant at Pinewald, N. J., won its case against a former employee who sought \$25,000 damages for alleged contraction of silicosis.

Witnesses for the company testified in regard to signs which had been placed at the plant warning employees of the risk that they were taking of contracting silicosis. It was testified that the signs were put up in 1931 on the advice of the judge who sat that year in the trial of five silicosis cases. (The same judge was hearing this case.)

Both witnesses testified that the company had done everything humanly possible to protect its employees; one exhibited 11 types of masks designed especially to protect employees from inhaling the fine dust which collects in the lungs and causes silicosis.

The witness said that the company had a standing order with the most prominent firm in the country to be supplied with every new type of mask that is perfected and approved by the U. S. Bureau of Mines. He said that each new type is tested out at the plant and is used until a better mask is devised, unless employees find it unsatisfactory.

The witness identified the various masks that had been developed, told of the dates when they first came into general use, and the manner in which they were succeeded by improved types.

The officials of the company also submitted the firm's data on claimant, showing that the man had originally been engaged as a tender on a dredge in the lake of the plant and that he was called up on the average of only once or twice a week to perform carpentry service in the main building where he testified, he contracted the disease.

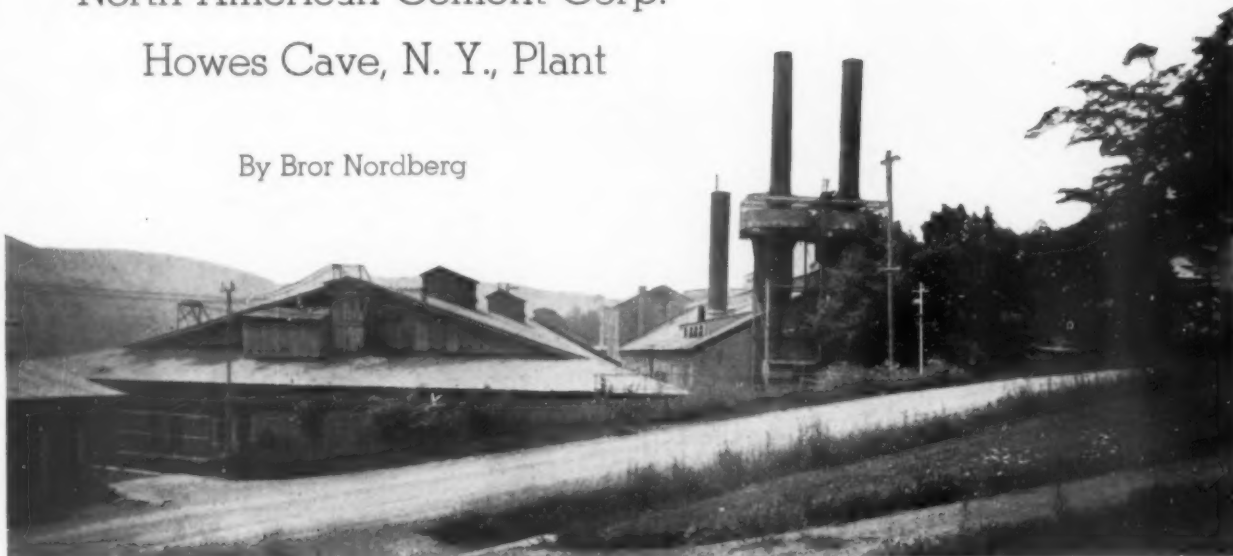
The judge, in his ruling, cited this evidence and said that there was no proof of negligence or neglect on the part of the company, but that apparently the firm had taken proper measures to warn and safeguard its employees.

New Equipment and Processing Show Latest in **CLINKER CONDITIONING AND GRINDING**

North American Cement Corp.

Howes Cave, N. Y., Plant

By Bror Nordberg



General view of the Howes Cave, N. Y., plant of the North American Cement Corp.

NEW YORK STATE'S NEW SPECIFICATION for portland cement requiring a specific surface area of 1750 sq. cm. per gram has materially affected operating methods of many plants, some of which are installing special equipment to meet this rigid requirement. Others in their modernization plans have incorporated such equipment while at the same time generally improving the plant efficiency.

The Howes Cave, N. Y., plant of the North American Cement Corp., Albany, N. Y., is one of the latter, which has been generally revamped in the finish grinding end of the plant. Other in-

stallations to improve the general operating efficiency and the quality of the finished product are a new method of handling clay, two-stage cooling of the cement clinker and dust-collecting equipment.

In 1935, a clay pit deposit on the hill adjacent to the plant was abandoned in favor of one farther away containing a higher grade material for the manufacture of cement. Different handling methods were needed, since clay is now hauled to the plant by truck. The trucks discharge directly into a hopper, from which the clay is elevated

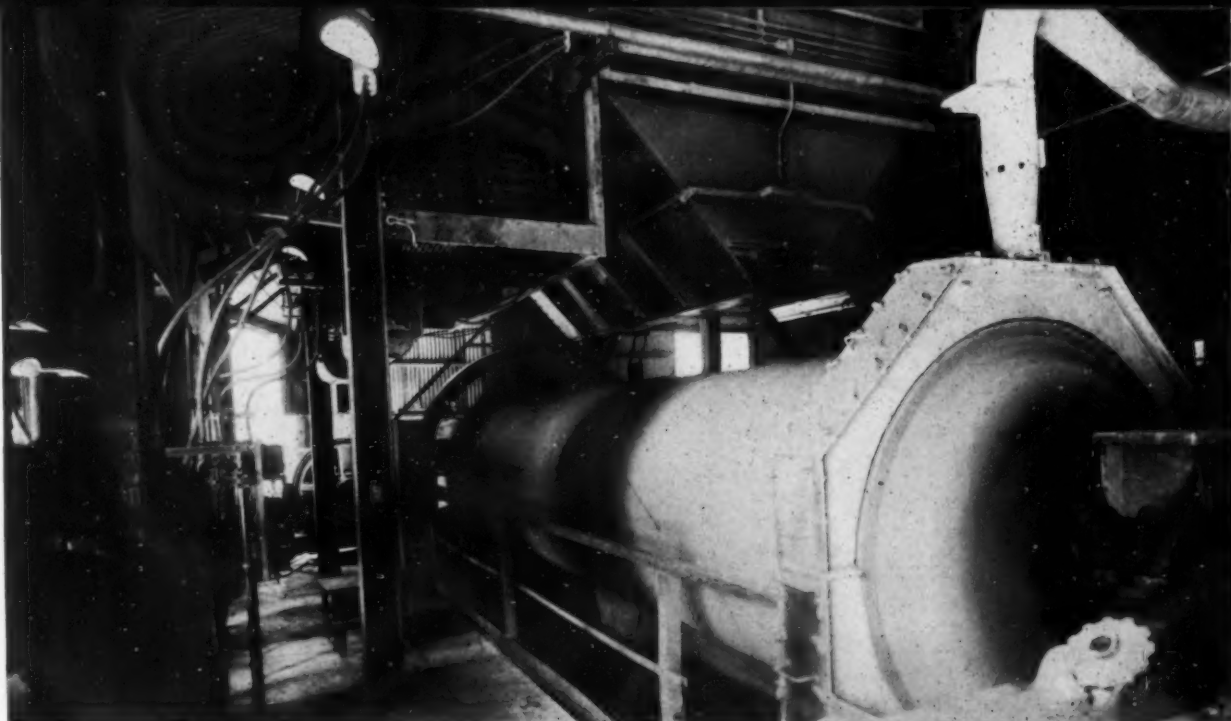
to storage by a Bartlett-Snow 6-cu. yd. semi-automatic skip hoist.

Clinker Conditioning

An innovation is the introduction of a secondary, air-quenched type, vibrating clinker cooler to reduce clinker temperatures below those obtainable in the regulation coolers in use for years. Having a uniform low temperature clinker immediately available for feed to the grinding mills has been instrumental in reducing grinding costs as well as speeding up and improving the grinding of clinker.

Clay is hauled in by truck and placed in storage by a semi-automatic skip hoist





Individual steel clinker feed bins have been installed over each finish mill

There are three 10-ft. x 9-ft. x 180-ft. Vulcan kilns in operation at this plant. Previous to the installation of the new clinker cooler, each kiln was equipped with its own cooler and clinker emerging from these coolers was ready for grinding.

The No. 2 and No. 4 kilns have F. L. Smidth & Co. Unax coolers while clinker from the No. 3 kiln is cooled through an F. L. Smidth pressure cooler. The average temperature of the clinker from each of the three kilns previous to installation of the new cooler was

about 400 deg. F. as the clinker passed to storage.

The new cooler, a Jeffrey-Traylor vibrating cooler, is installed for a two-fold purpose. First, it is desired to cool clinker to the lowest practical temperature to raise the grinding efficiency in the preliminary and finish grinding mills. And secondly, a much more constant clinker temperature is now possible, tending toward a more uniform grinding practise. In other words, the new installation "irons out" the variable temperature difference of clinker com-

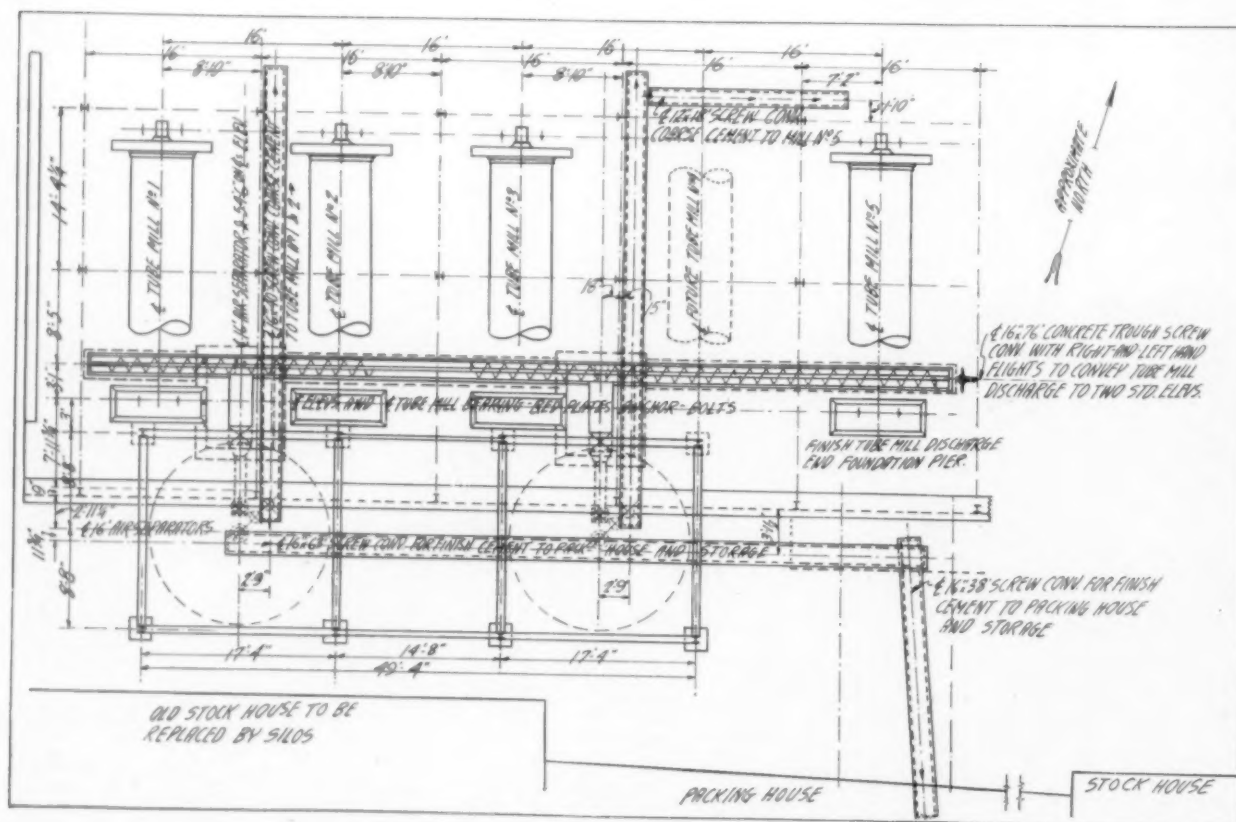
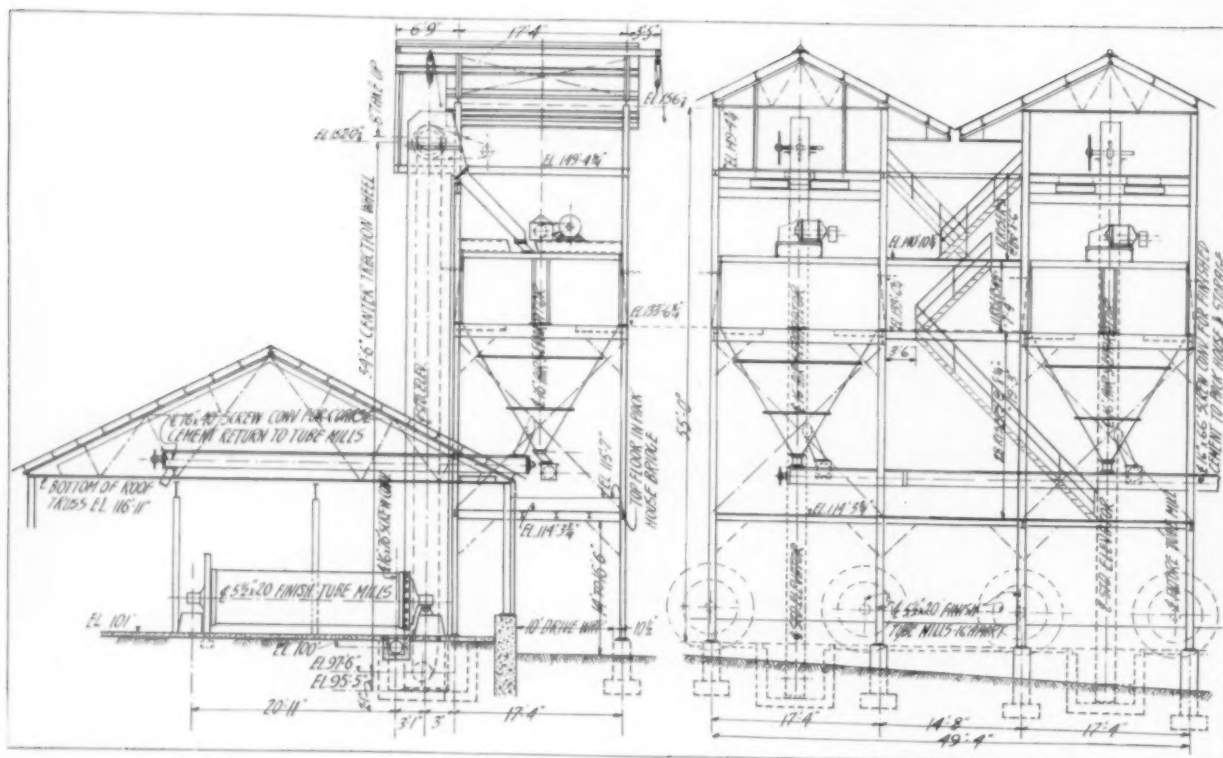
ing from the three primary coolers.

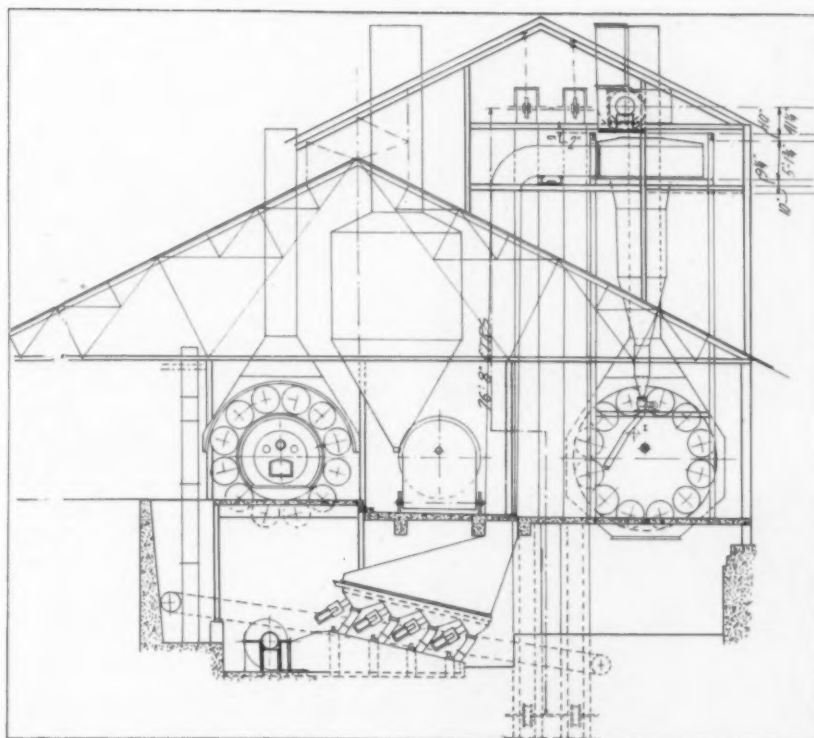
The vibratory cooler is 20 ft. in length and has a width of 42 in. It was installed last winter directly under the kiln-burners' platform and below the No. 3 kiln, so that the clinker discharged from the three kilns may readily be transferred to this centrally-located cooler.

A small collecting or surge bin, or rather feeder bin, has been built directly above the cooler. The clinker discharged from No. 2 kiln through its Unax cooler chutes directly to this bin. A Jeffrey

One of the 16-ft. air separators closed-circuited with the finish mills







Sectional elevation showing relative position of clinker coolers

drag chain carries clinker direct from the No. 3 and No. 4 kiln discharges to a short chain bucket elevator serving this bin.

Clinker from the feeder bin passes over a grate in the cooler, having a slope of $12\frac{1}{2}$ deg. to the horizontal. The grate has slotted openings over its length through which cooling air is forced. An American Blower Co. Sirocco fan, having a capacity of 30,000 cu. ft. of air per minute, pulls air into a chamber below the vibrating grate and forces approximately 12,000 cu. ft. of air per minute up through four ports to pass through the grate.

Four Jeffrey-Traylor vibrators below keep the grate in a constant state of agitation as the clinker passes over it. About 3000 bbl. of clinker—the output of the three kilns—passes over the grate every 24 hours. By vibration, the clinker is constantly turning over and coming into contact with the cooling air.

The cooler is hooded above the grate and a similar Sirocco fan pulls the air to a cyclone where dust is precipitated and returned to the clinker storage bin. Clinker temperatures are reduced from 400 deg. F. in coming into the secondary cooler to about 60 deg. F. above atmospheric temperatures. Clinker is stored in a 5000-bbl. storage bin.

Finish Grinding

Two years ago, the finish end of the plant was completely revamped as part

of the modernization program in preparation for the New York state specific surface requirement. The old clinker bins were torn out and replaced by a steel bin of 300-bbl. capacity over each finish tube mill. Each of the five new bins has a 10-in. screw feed.

Clinker from the 5000-bbl. storage bin is fed to a Hardinge 10-ft. x 48-in. mill and to three F. L. Smidth No. 66 Kominuters. From these mills, it is delivered to two sets of W. S. Tyler Co. Hum-mer screens. Rejects return to the preliminary mills while the fines go to the tube-mill feed bins. Fineness of the feed to the tube mills is 46 percent minus 200-mesh.

In the winter of 1937, two Sturtevant 16-ft. air separators were installed and a fifth F. L. Smidth No. 16 tube mill was added for final grinding of clinker. The extra mill was added to further distribute the clinker load for greater grinding efficiency, and because the air separator capacities are sufficient to easily meet requirements for increased capacity in the future.

Three mills are closed-circuited with one separator and two with the other, the separators being set for difference in feed. The mills are the peripheral discharge type and the circulating load is about 100 percent.

The mill discharges are elevated by



Clinker temperatures are reduced considerably through this vibrating secondary cooler



Dust collector to remove dust from finish mill building



Electrical control board for operation of finish grinding equipment

two Link-Belt, 62-ft., chain-bucket elevators to the separators. Rejects are returned by a 16-in. screw conveyor to the feed end of the mills where they are split and again passed through with the fresh feed. To meet the specification requirement for a specific surface of 1750 sq. cm. per gram, normal cement is manufactured to regularly test 1820 sq. cm. per gram, with a fineness of 97 percent through 325-mesh. The finished product is carried to the stock-houses by a 12-in. screw conveyor. Because of the gain in efficiency by closed-circuit grinding with air separators, the plant capacity has not been reduced, even at the higher specific surface.

Coincident with the revamping of the finish end of the mill, a standard Blaw-Knox dust collector was installed to remove dust from the mills, elevators and conveyors in the finish grinding end of the plant. Fines collected are returned to the tube mills through screw conveyors. Dust is removed through hoods over the discharge of each mill and from various points in the screw conveyors.

Fighting Cement Importations

FLORIDA PORTLAND CEMENT CO., Tampa, Fla., according to press reports started action recently in the Supreme court at Tallahassee, Fla., to require enforcement of the cement inspection tax bill passed by the 1937 legislature. It is reported that the company filed a mandamus action against the Florida State Road Department which, if it becomes final, would require the department to inspect all cement imported into Florida and charge an inspection fee of \$3 a ton.



Another view of the Howes Cave, N. Y., plant

Chemists' Corner

Limits to Use of Computed Compounds in Predicting Properties of Portland Cement

By DR. GABRIEL A. ASHKENAZI

Consulting Chemist, New York City

IN A PREVIOUS ARTICLE the writer¹ pointed out that at the present state of cement research no formula based on chemical composition of portland cement can predict its properties exactly. In accordance with this view, he does not believe that the properties desired in portland cement should be specified by its chemical composition. In this article the writer tries to develop this subject further.

We know that portland cement presents a heterogeneous system of several ingredients. During the last forty years, since Törnebohm in 1894 advanced his theory about portland cement as an artificial mineral composed of Alit, Belit, Celit and Felit, our knowledge of the structure of cement clinker has been immensely enlarged. But in spite of this enlargement of our knowledge, the old definition of portland cement, as a "product obtained by calcining to incipient fusion an intimate mixture of argillaceous and calcareous materials, so proportioned, that the ratio of calcium oxide to the sum of the oxides of silicon, aluminium, iron should not exceed 2.2, nor be less than 1.7, still stands the test.

This definition admits large variations in the chemical composition, but the petrographic and physical investigations have detected in portland cement clinker at least four important compounds. These individual constituents, which form the clinker, have been prepared synthetically and their properties established.

The next step was an attempt to determine the expected properties of cement, taking into account the properties of its individual compounds. We became accustomed to consider portland

cement in terms of tricalcium silicate, dicalcium silicate, tricalcium aluminate and tetracalcium-aluminaferrite. Unfortunately, we do not possess a method for a direct estimation of the amounts of these compounds in cement. R. H. Bogue invented the well-known indirect method: calculating the amounts of the compounds present in portland cement from the chemical analyses.

No Conclusions Possible

The tendency to draw a conclusion in regard to the qualities of cement from its computed composition resulted in every consumer who needed a great quantity of cement meeting special requirements, limiting the amount of the one, or other of the compounds, not to mention the numerous specifications with similar regulations. As a consequence, the manufacturer has to make several kinds of cement and keep them in stock. There are plants which have stocked up a dozen and more brands of cement. How far this situation must affect the industry is a chapter by itself and it deserves to be written.

The situation is peculiar indeed, because from the purely scientific point of view we have not sufficient knowledge to justify requirements regarding the properties of portland cement in connection with the amounts of the four compounds.

Firstly, the behavior of the individual compounds as C_3S , C_2S , C_3A , C_4AF in their pure form, gives no right to assume that they will behave in the same way in a complex combination such as portland cement.

Secondly, the four compounds do not represent all the ingredients which form commercial portland cement.

About the others, however, we know very little.

Thirdly, even though admitting that the other ingredients are of minor importance, we have no direct and reliable method of estimating the real proportions of the four principal compounds.

Different Assumptions Give Different Results

R. H. Bogue's method of computation depends on the correctness of the analytical values and, of course, on the correctness of the theoretical postulations. It is known that slight differences in the analytical values, which are acceptable from standpoint of an analytical chemist, result in considerable divergences of the computed data. For instance, a plus error of 0.2 percent Al_2O_3 will increase the computed 3 $CaO \cdot Al_2O_3$ about 0.5 percent, decrease the computed 3 $CaO \cdot SiO_2$ about 1.3 percent, and increase the 2 $CaO \cdot SiO_2$ about 1.0 percent. Regarding the theoretical postulations, R. H. Bogue² himself pointed out that his "represent the best available information, but are subject to revision and extension." This was written in the year 1929. Since that time our knowledge has increased. The investigations of F. M. Lea and collaborators unveiled new points. The application of the formulas of Lea for the calculation of compounds in portland cement gives results which differ considerably from those obtained by the method of Bogue. The following example will illustrate these differences.³

Assuming we have a cement containing 68 percent CaO , 23 percent SiO_2 , 7 percent Al_2O_3 , 2 percent Fe_2O_3 . The calculation of compounds according to the

formulas of Bogue and Lea will give results as follows:

properties of cement are functions of the compounds present rather than of the

Compounds	Crystallization to complete equilibrium acc. R. H. Bogue	Equilibrium frozen from clinkering temperature acc. F. M. Lea.	
		Liquid crystallizes independently	Liquid forms glass
3CaO.SiO ₂	52%	60%	60%
2CaO.SiO ₂	27%	21%	15%
Glass	0%	0%	25%
3CaO.Al ₂ O ₃	15%	9%	0%
4CaO.Al ₂ O ₃ .Fe ₂ O ₃	6%	6%	0%
5CaO.3Al ₂ O ₃	0%	4%	0%

There was an opinion expressed that the method of Bogue should be modified. The writer wishes to state that he does not share this opinion. The formula of Bogue, as well as the formulas of Lea consider special cases of compound formations in cement. Bogue assumes that the compounds crystallize to complete equilibrium; the formulas of Lea are based on an equilibrium frozen from clinkering temperature according to Lea⁴ the "liquid may crystallize completely and independently of the already existing solids, it may all become a glass, or some conditions intermediate between these may occur. . . . It was possible to develop formulas for the extreme conditions. . . . No attempt was made to develop formulas which would include intermediate cases. This stage, however, in which part of the liquid crystallizes and part becomes glass, seemed most obviously the real condition in clinker; moreover different clinkers appeared to vary within this intermediate stage." Therefore as long as both methods do not cover all conditions of formation in clinker, they can be used only in order to obtain comparative results. And in this respect the calculated compound method of Bogue gives very useful indications. The writer agrees that this method "has been a valuable aid in the work of manufacturer," but he disagrees that it can be applied as a "useful approach to a solution of the problem of specifying cement properties by limiting chemical constituents."

Government Specifications

At the 33rd annual convention of the American Concrete Institute this year there were presented four new specifications for portland cement which have been adopted by the Federal Specifications Board for all federal public works. The new specifications cover chemical composition by limiting the analytically estimated amounts of the oxides of Ca, Mg, Al, Fe, and Si. The established limits do not contradict industrial practice, and, as Commander Ben Moreel⁵ outlined "were merely picked of various cements which had been shown to have satisfactory properties." Regarding the four compounds, it was "recognized that while there are many evidences that the

components, there are some striking inconsistencies, and it appears highly probable that the calculated compound theory does not tell the whole story." Nevertheless the new specifications specify the proportion of tricalcium aluminate. The contents of tricalcium silicate and bicalcium silicate, however, are not limited. From this writer's viewpoint the new specifications are more advanced than the old. It would be certainly of advantage, however, if limiting the amount of C₃A could also be omitted.

The tricalcium aluminate is a compound whose existence in commercial portland cement is very difficult to detect. The computation does not give reliable results; the technique of discovering it by means of petrographic examinations requires great experience; the attempts to estimate its amount by microscopic method failed. In many cases C₃A cannot be detected in commercial cement, although the computation of compounds showed a considerable amount of it. The recent investigations of H. Insley,⁶ by means of a new metallographic method, indicate that "evidence as to the existence of tricalcium aluminate in normal commercial portland cement clinker is questionable."

The following example shall once more illustrate how uncertain it is to draw a conclusion from the computed composition regarding the qualities of a cement of a high amount of computed tricalcium aluminate. F. B. Hornibrook⁷ and collaborators, investigating the effect of partial prehydration on cement, examined, among others, a standard portland cement of the following chemical composition:

Si O₂=19.7%; Al₂O₃=7.6%; Fe₂O₃=2.4%
CaO =64.1%; MgO =3.3%; SO₃ =1.8%
Loss on ignition: 1.1%; insoluble: 0.2%;
free lime: 0.4%

The calculation of compounds according to R. H. Bogue gives results as follows:

C₃S=50%; C₂S=19%; C₃A=19%;
C₄AF=7%

How Harmful is C₃A?

It is known that tricalcium aluminate develops a great heat of hydration and

disintegrates in water completely. We mentioned before that the behavior of the individual compounds in their pure form gives us no right to assume that they will behave in the same manner in a heterogeneous system, such as portland cement. But an amount of 16 percent of a heat developing and disintegrating constituent should unfavorably affect the hydraulic binding properties of cement. We should expect a considerable development of heat of hydration and a poor hardening process with a decrease of resistance to stress.

According to the computed proportion of compounds the heat of hydration developed by this cement should reach (7 days, tested at 70 deg. F.) 117 cal./g. The *de facto* estimated value was 84 cal./g only, i.e., about 40 percent less than the calculated one.

The compressive strength test made on 3 to 6 in. cylinders, prepared of 1:2:4 mix by volume using Potomac river sand and gravel and a cement/water ratio of 1.45, showed instead of a decrease an increase of strength. The obtained results were as follows:

7 days compressive . . . 1950 lb./in.²
28 days compressive . . . 3410 lb./in.²
1 year compressive . . . 3870 lb./in.²

According to the new specifications adopted by the Federal Specifications Board, the proportion of tricalcium aluminate in standard portland cement shall not exceed 15% of the whole composition. The cement referred to above, regarding the contents of C₃A, does not comply with the requirements of this specification. Nevertheless, it presents from a practical point of view a satisfactory brand—an average American standard portland cement.

Furthermore, F. B. Hornibrook⁸ found out that the process of "prehydration" (treatment with steam) decreases the heat of hydration. After a moderate prehydration the heat of hydration decreased from 86 to 66 cal./g. (7 days, 70 deg. F.). This process of partial prehydration, altering the loss of ignition of this cement from 1.1 to 3.0%, practically did not change the analytically estimated values of Fe₂O₃ and Al₂O₃, i.e., did not change the proportion of 3 CaO.Al₂O₃. The heat of hydration, however, decreased as low as to 66 cal./g., almost reaching the limits of "low heat" cement, regardless of the computed 16 percent of tricalcium aluminate.

This example may show once more how cautious one must be in judging a portland cement according to its computed composition.

We therefore think that a specification for portland cement should specify certain properties as resistance, fineness, setting time, heat of hydration, soundness; eventually, shrinkage and elasticity, and something of established

chemical limits. Requirements connected with chemical composition, especially those with proportions of computed compounds, should be omitted.

The producer himself will determine the right way and the suitable mixture in order to make a product of required properties. In spite of extensive purely scientific work and its great achievements, the technical methods used by the manufacturers have still an advantage over purely scientific ones. Portland cement is a technical product made of natural raw materials. The individual properties of raw materials and the particular manufacturing conditions of his plant force every manufacturer to apply the scientific knowledge suitably to the special circumstances of his production.

References:

- 1) ROCK PRODUCTS, February, 1937, p. 50.
- 2) Paper No. 21, Portland Cement Assoc. Fellowship at the National Bureau of Standards, p. 3.
- 3) F. M. Lea and C. H. Desch: The Chemistry of Cement and Concrete, London, 1935, pp. 117-119.
- 4) Concrete (Cem. Mill Sect.), April, 1937, p. 154.
- 5) J. Am. Concr. Inst., 1937, v. 8, No. 4, p. 447.
- 6) Nation. Bureau of Stand. J. of Res., 1936, R. P. 917, pp. 353-361.
- 7) Nation. Bureau of Stand. J. of Res., 1936, R. P. 887, p. 487.
- 8) Ibid, p. 494.

City Opposes Operation

UNITED SAND AND GRAVEL CO., Morrisville, Penn., was recently sued by the borough of Morrisville in an attempt to prevent the company from operating its plant in the borough. The city claims that a zoning ordinance adopted a few years ago prohibits operations, since the plant had been abandoned during the depression.

Investigating Rock Wool Possibilities

NORMAN V. PLUMMER, ceramist for the Kansas state geological survey, recently conducted an investigation of limestone deposits in Finney county near Garden City, Kan. to determine their fitness for the manufacture of rock wool.

Leases Offices

BELGIAN CEMENT ASSOCIATION has leased space for its first American office in the International building, Rockefeller Center, New York, N. Y.

Break into Tool House

HOWARD THOMAS rock quarry suffered the loss of a variety of small tools, gasoline and oil when a thief broke into the plant tool house recently.

Another National Gypsum Co. Expansion

NATIONAL GYPSUM CO., Buffalo, N. Y., is planning construction of a \$2,000,000 plant at Mobile, Ala. for the manufacture of insulation fibre board. This will be the company's first pulp board plant.

Production Stepped Up

SUGAR CREEK QUARRIES, E. F. Armbrust owner, is increasing capacity to 500 tons per day to take care of a highway construction job.

Lower Gravel Rate

NEBRASKA RAILWAY COMMISSION has granted authority to the Missouri Pacific railroad to establish a rate of 50c per ton for hauling sand and gravel between Louisville and Julian. The former rate was 60c.

Injured by Drill

CARTHAGE MARBLE CORP., Carthage, Mo., had an employee injured recently when a piece of steel from a drill he was using became imbedded in his shoulder.

Completes Railroad Siding

ARKANSAS CITY SAND AND GRAVEL CO., Arkansas City, Mo., has completed a railroad siding and a loading ramp for shipments on the Santa Fe. The new 700-ft. siding will shorten the company's truck haul to the railroad.

New Gravel Plant

B. O. NICHOLAS, Tampa, Fla., recently started production at his new sand and gravel plant at Marianna, Fla. G. R. Williams is general superintendent of the company.

Artificial Marble

INDEPENDENT RESEARCH CORP. is making an artificial marble in Casper, Wyo. from serpentine rock which is a waste product of asbestos mining. The rock is mixed with a variety of chemicals, all obtainable at Casper, to form a powder which is mixed like cement and poured into forms. The finished product is ready for use in eight hours and is said to be absolutely shatterproof. Coloring ingredients may be mixed in to supply the peculiar colors of genuine marble.

To Open Old Mica Mine

A NEW CONCERN has been organized to reopen the old Clarrissa mica mine in Mitchell county, S. C., which has been closed for many years because of water conditions. New machinery and equipment are being installed and a single pump capable of lifting the water 500 ft. Frank B. Fortner, Spruce Pine, N. C., Fuller Brown, Asheville, N. C., and E. C. Guy, Newland, N. C. are the principal men interested in reopening the mine.

Adds Capacity

KINGSTON TRAP ROCK CO., Kingston, N. Y., this spring increased capacity to 3000 tons of crushed stone in 10 hours. A new type Marion 4161, electric 4-yd. shovel was placed in operation in the quarry. To handle the larger volume of stone now made available to the crusher, the Farrel-Bacon primary jaw crusher has been increased to 48-x60-in. Two Kennedy gearless gyratory crushers, a No. 19 and a No. 37, were added to handle increased stone tonnages. The screening plant, as originally designed, was adequate to take double the capacity of the plant when built.



New type electric 4-yd. shovel at the Kingston Trap Rock Co., Kingston, N. Y.

Mining Methods Employed To Work

A Unique Gypsum Deposit In Montana

By A. M. TURNER

Supervisor of Plaster Quality

Three Forks Portland Cement Co., Hanover, Mont.

THE GYPSUM DEPOSIT which will be discussed in this article is located at Hanover, about 7 miles west of Lewistown, which city is located in the geographical center of the state of Montana. This deposit is owned and operated by the Three Forks Portland Cement Co. The only other gypsum operation in the state is the plant of the United States Gypsum Co., at Heath, about 18 miles east of Hanover.

Although much gypsum occurs in the state, very little literature is available on the subject. Important among these formations are the Kibbey (just above the Madison limestone), Ellis (the Hanover and Heath deposits) and Chugwater (only in southern Montana).

The deposits within the Kibbey are best developed along Otter Creek a few miles southeast of Raynesford and along Smith River about 30 miles from its mouth. It is reported that gypsum beds in these localities are in places 25 ft. or more thick and that they are extensive. A smaller or local deposit of gypsum also is known in the Kibbey on the south side of the Big Snowies northeast of Rothliemay.

The Ellis gypsum seems to occur in commercial thickness only in the Heath and Hanover areas. The Chugwater gypsum beds may be as much as 35 ft. or even more in thickness. These deposits lie along the west flank of the Bighorn Mountains. Some impure gypsum was mined near Limespur about 20 miles west of Three Forks, but little is known of the Limespur deposit. In the Kevin-Sunburst oil field the thick beds of anhydrite were encountered in deep

drilling in strata believed to be of Devonian age.

The feature which makes the Hanover property unique is the fact that the gypsum vein along with accompanying formations has been pushed up from below and formed into a dome. At the apex of the dome erosion has removed some of the formations, including a portion of the gypsum, the area of which corresponds roughly to a circle with a diameter of about 3000 ft. The result of this erosion is that the gypsum outcrop, if followed for a distance of about a mile and a half, will lead to the original starting point as illustrated by the accompanying map.

As may be seen from the accompanying cross-sectional sketch of the formation, the deposit consists of two gypsum veins which, on account of the earth's distortion that formed the dome, lie at an average angle of 20 deg. dip. Both the hanging and foot walls are composed of very dark colored limestone. The gypsum itself runs about 98% pure. A small amount of limestone and anhydrite is disseminated throughout the gypsum. Due to the fact that in the mining process some of the limestone from the roof and floor of the mine is loosened when blasting, the average purity of mine-run rock is about 94%, but for certain purposes the mineral is picked by hand and a 97% pure product may be obtained.

Mining Methods

The room and pillar method of mining is used for recovering the mineral from the deposit. However, to meet the

conditions brought about by the slope of the veins, it is necessary to have several haulage levels in the mine. The gypsum in the upper portion of the vein is worked by stoping. The gypsum in the upper levels of the mine is loaded into cars. These cars are pushed by hand along tracks which lead to chutes into which their contents are dumped. As desired the rock in these chutes may be drawn from the discharge end on the main haulage level and loaded into cars.

A section of the mine which has been worked out is a series of rooms and pillars sloping on a plane which corresponds to the dip of the vein. The bottom or main haulage level varies from 100 to 300 ft. below the surface. Gasoline locomotives are used to pull trains of dump cars in this level to transport the gypsum from the working face to the shaft where it is hoisted to the surface and crushed. The gypsum is dumped from the cars into chutes, which fill the buckets of the skip and are subsequently hoisted to the surface.

In preparing this article there has been no effort made to write in detail about the equipment used or methods employed. The practices used in this operation are, generally speaking, standard and common to those working in the industry. As the title implies it is more the things of unique interest which are to be emphasized.

"God Save the Rat"

From a standpoint of what we might call psychological interest, it may be worth devoting a little space at this time to make a note about a pack rat



Cross section of deposit which shows relative position of 8 foot and 6 foot veins of gypsum separated by limestone

which seems to serve a definite function in the operations. This rat, which is apparently the only one in the mine, has built a nest in a crevice formed between the roof of the mine and a large pile of waste rock which has been built up in an abandoned part of the mine. The nearest exit to the surface from this place is an air shaft about 250 ft. distant, through which the rat has brought dry grass and twigs for nesting material.

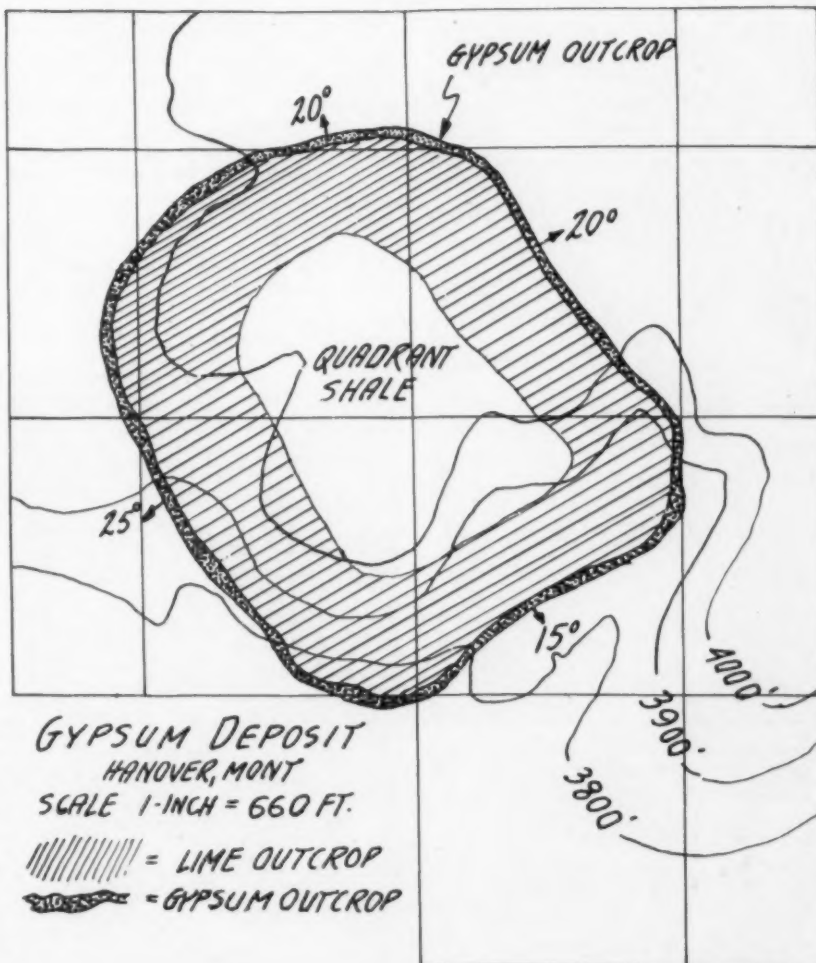
The rodent is treated with every kindness by the miners who provide it with food and zealously protect its life. While little comment is made regarding its treatment, there is a general understanding that the workmen consider its presence a harbinger of safety. If at some time the rat should leave the mine and this news was learned by the workmen there is no doubt that it would be with much reluctance that the men would return to their workings.

Dealing With Faults

Minor faults throughout the area of the deposit have caused breaks in the gypsum vein. These faults occur at irregular intervals varying from one hundred to several hundred feet apart. When one of these faults is contacted the gypsum in the mine face is replaced by limestone. The distance which the tunnel has to be driven through the limestone to again pick up the gypsum varies from a few feet to 25 or 30 ft. During the past 20 years that the mine has been in operation this condition has quite consistently prevailed, but so far the gypsum has always been found in about the same relative position after penetrating the intrusion caused by the fault.

About 8 years ago a major fault was encountered in the workings which developed a problem of rather serious consequence. Instead of the gypsum being replaced by limestone as in the minor faults the material which appeared in the mine face was a soft shale. In the mine as a whole it is not necessary to timber and a cave-in has never occurred.

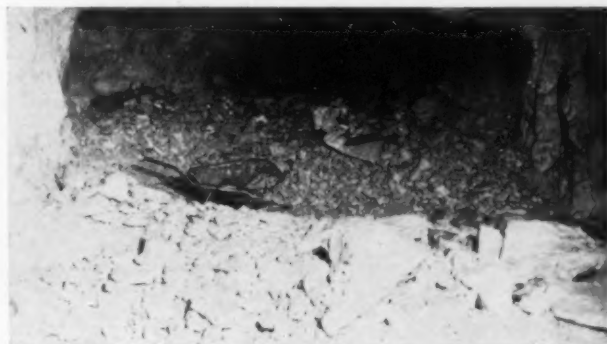
However, the tendency for the soft



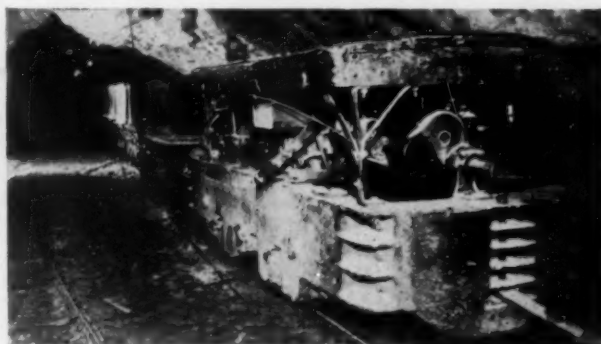
shale to push into the tunnel was so great that it was hard to make any progress with the face of the mine going through this material. The timbering which was finally found adequate for the job consisted of a framing of 12 x 12's set on floor, roof and walls every few feet with lagging filling in the open spaces. Even today the pressure of the shale is so great the 12-in. timbers are often cracked and have to be replaced.

The pressure is constantly relieved by removing some of the shale from the places where it has tightened against the timbering.

A timbered tunnel 400 ft. long had to be driven through the shale to reach the gypsum on the other side of the fault. In this shale intrusion there is a seam of coal a few inches in thickness. The coal is of a low grade and has no commercial value.



Stope showing gypsum rock which has been shot down. The gypsum will be transferred into chute and held in readiness to be loaded in mine cars



Locomotive and cars used in main haulage level to transport gypsum to hoist shaft



Upper end of chute into which gypsum from higher levels is dumped. Lower end of chute comes out at main haulage level

Sink Holes and Caves

The present face of the mine is under a coulee through which a small stream of water runs. This water does not seem to seep down into the gypsum. However, at the surface in this vicinity are sink holes which occur along the line of the gypsum outcrop. Underground in the vicinity of these sink holes a number of caves have been encountered. These caves are in the form of large rooms from 25 to 75 ft. long following along the gypsum vein. One of these caves extends from the bottom level of the mine downward along the vein. The cave is full of water which comes to within a foot or two of the mine floor. The depth of the water is a subject for speculation.

In the caves are found many fine specimens of selenite. Occasionally when drilling in the face of the bottom level a pocket of water is punctured. Water sometimes spurts out through the drill hole for a number of hours unless the hole is plugged. However, experience has shown that these reservoirs will drain out relatively fast and no serious damage is incurred.

Throughout the main haulage level the aggregate water flow from various small seeps builds up a small flow of water which drains into a sump located at the foot of the mine hoist. From this sump a drainage tunnel several hundred feet long has been built and this allows the water to run off into Spring Creek

which flows along the foot of the mountain wherein lies the gypsum deposit.

A brief description with reference to the accompanying topographic map will clearly show unique features of this particular gypsum deposit. The mine hoist shaft location would be at a point which corresponds to the place on the bottom of the map where the two quarter-section lines intersect at the gypsum outcrop. The mine has been driven for some distance on both sides of the hoist. However, probably not more than about half of the deposit has been excavated



Showing the lower end of a chute where gypsum is loaded into cars on main haulage level

to date. If mining operations continue for a sufficient length of time the underground passage will follow approximately the direction of the gypsum outcrop as pictured on the map.

Limestone for Manufacture of Sugar

SANTA CRUZ PORTLAND CEMENT Co., San Francisco, Calif., will furnish about 18,000 tons of limestone to the Spreckels sugar factory at Woodland, Calif., this season to be used as a source of carbon dioxide in the sugar refining process.

Injured by Falling Rock

PEERLESS WHITE LIME Co., Ste. Genevieve, Mo., recently had an employee seriously injured when stone rolled

from a car striking him on the head and leg. His leg was broken between the knee and ankle. Curiously enough an employe of the Ste. Genevieve Lime and Quarry Co. nearby was also injured by a heavy stone falling on his head from the roof of a tunnel. A metal helmet, which was pierced by the stone, undoubtedly prevented more serious injury in this case.

To Investigate Phosphate Development

H. P. TAYLOR, Idaho state planning board engineer, has been appointed engineer with the state phosphate commission. Recently Mr. Taylor attended the phosphate conference at Muscle Shoals, Ala., to make a study of the phosphate development at Muscle Shoals which may be transferred to the development of Idaho's vast deposits.

Mica Market Shows Recovery

PRODUCERS OF MICA at Spruce Pine, N. C., are predicting that mica production and processing locally will show greater activity in the next few years than at any time in the past. The outlook for finished punch and sheet mica is particularly good while sales of roofing and by-product mica have been slow for some time.



W. G. Allen, mine foreman, standing in entrance to mine. This opening affords convenient access to working faces for the miners and also facilitates natural air circulation throughout the working

Virginia Limes

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va., has published as Engineering Experiment Station Series Bulletin No. 23, "The Effect of Various Types of Storage on the Particle Size and Mineralogical Content of Two Virginia Limes," by John W. Whittemore, professor of ceramic engineering. Paul S. Dear, instructor in ceramic engineering, and Maurice A. Tschantre, research fellow in ceramic engineering. The limes studied were contributed by the River-ton Lime and Stone Co., Riverton, Va.; one was a mason's hydrate and the other an eminently hydraulic lime hydrate. The conclusions show, apparently, that the finer the hydrate the more readily it carbonates. The hydraulic lime hydrate did not carbonate so readily as the mason's hydrate. The silicates were found mostly in the coarser fractions of both hydrates. Under average room atmospheric conditions, limes similar to those studied could be stored for several months in commercial bags without danger of exceeding the permissible A. S. T. M. limit for carbon dioxide.

Working Overtime

HERSEY GRAVEL CO., Hersey, Mich., resumed operations recently at full capacity.

Variations in Limes

NATIONAL BUREAU OF STANDARDS, Washington, D. C., has published "Differences in Limes as Reflected in Certain Properties of Masonry Mortars", by Lansing S. Wells, Dana L. Bishop and David Watstein. A survey was made of commercial quicklimes and hydrated limes with respect to some physical properties of importance to their use in mortars. Measurements of soundness, plasticity, and flow after suction were made on putties prepared from the quicklimes and hydrated limes and flows after suction were measured on cement-lime mortars prepared from the lime putties. It was found that the properties of the different limes varied widely. Flows after suction of lime mortars were roughly proportional to the plasticities of the lime putties. The properties of a lime were found to be more important than the proportions of lime used in preparing cement-lime mortars having high flows after suction.

Large Granite Contract

QUARRIES OPERATING CORP., Quincy, Mass., has been awarded a \$150,000 contract for granite to be used in the construction of a dam in the metropolitan water district of the city of Hartford, Conn.



Head frame over mine shaft. Gypsum is hoisted out of mine and dumped into crusher building

Opens Quarry

OZARK WHITE LIME CO., Fayetteville, Ark., has opened a quarry a mile east of the present location at Johnson. Rock is hauled to the kilns by truck.



Working face of one of upper levels showing miner drilling with jack hammer. The plant suspended in foreground in horizontal and its relative position to ceiling shows angle of pitch of vein



The presence of a fault in one part of the mine has caused the gypsum to be replaced by shale. This section of the tunnel has to be framed with 12 x 12 inch timbers to prevent the passage from closing up



Bottom of shaft showing pocket into which gypsum is dumped for loading skip



This picture illustrates the pillars which are left between rooms to support the roof

LIME PRODUCERS' FORUM

Conducted by Victor J. Azbe, Contributing Editor, St. Louis, Mo.

DISSOCIATION ZONE OF LIME KILNS

KILNS AS BUILT in the past, particularly some, were mostly masonry and very little kiln, which to the writer is the hole in the middle. Shaft widths were as low as $4\frac{1}{2}$ ft.; areas of these shafts were down to 35 sq. ft. Kilns with shells as large in diameter as 18 or 20 ft. had very small shaft dimensions; and the reason was that one could expect only a comparatively short horizontal flame penetration, particularly when lime was made in small sizes.

Now all this is changed, and a shaft dimension of 9 ft.x7 ft., or about 60 sq. ft. shaft area in a 13-ft. shell, is entirely practicable; and as 60 sq. ft. can quite readily make 50 tons of high calcium lime and may make as much as 60, it shows that this is getting lime out of a small kiln.

Of course this smallness is in horizontal dimension but, if there are possibilities for night charging so top storage can be dispensed with, the kiln becomes small all around.

To drive kilns at the high capacity of close to a ton per square foot of shaft area per day is in no way harmful to the kiln. It may be less harmful than operating them at lower rates. It also is not harmful to the lime, and again to the contrary, most likely the lime will be better. The movement is so rapid that the time element necessary for damage is lacking.

This can be accomplished by the more ordinary method of hot zone construction, but the supreme results are not obtained until the center burner system of the style developed during the past few years by the writer, and now legally protected by patents, is applied.

It is easy to see why results should be better if heat is introduced directly into the middle of the shaft and there distributed, rather than to try to introduce the gas through the walls and then hope that it will penetrate to the middle of the shaft. Under the old system, in the effort to get the lime in the center of the shaft well burned, both the lime and the wall surface were damaged, and long kiln life, high capacity, and well burned but at the same time soft-burned lime, were not possible.

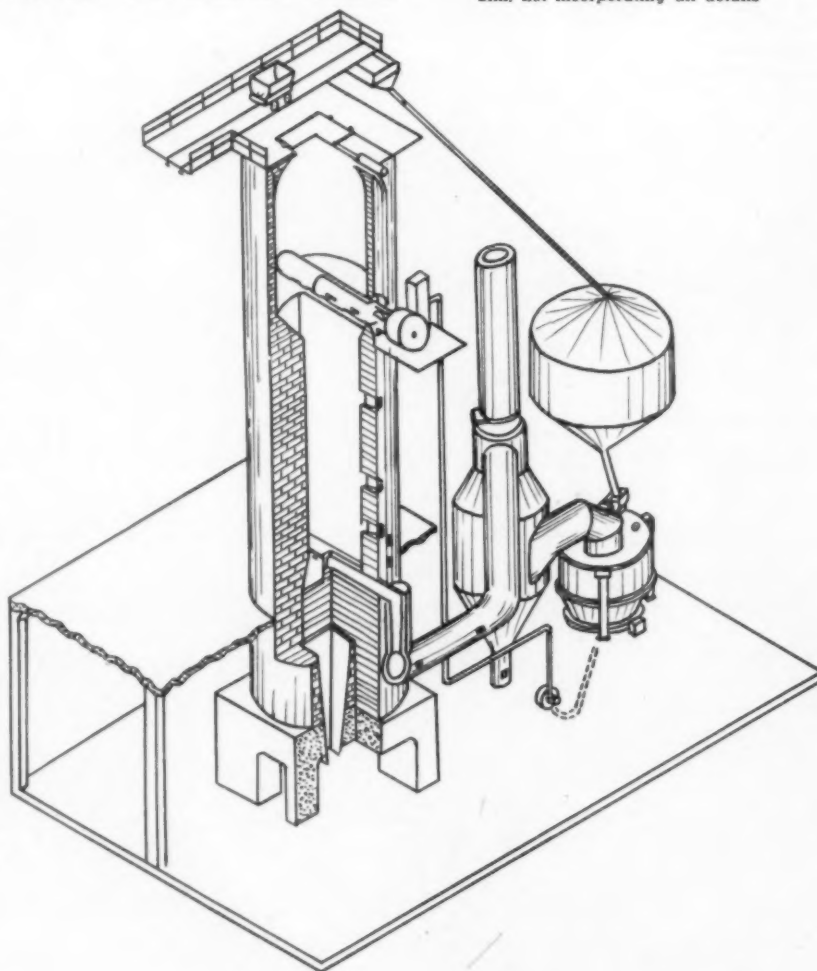
Fig. 1 shows approximately such a center-fired kiln which, however, lacks many of the details. For best or for special results the center burner can be elaborated along many lines and in natural gas practise it reaches the highest state of today. In that case the center burner is sectioned and gas control is independent to the center and different side sections of the kiln shaft. It is quite possible to draw one-quarter of the kiln and trim, while the other three-quarters are under full operation.

On these center-fired kilns the air enters the kiln only through the draw gates; the fuel, either natural or producer gas, enters green and by virtue

of the method of introduction at the point of gas entrance, temperatures are lower than they are higher in the kiln, which has the advantage that lime is passing here when core is being burned out through a lower temperature region, not so likely to damage it.

This lime in some cases is later allowed to drop into still another heated zone wherein the temperature is sufficient to finish the calcination but insufficient to damage the lime, and for this reason the zone is called the finishing zone.

Vertical sectional drawing of a center-fired kiln, not incorporating all details



* Part of a paper delivered by Victor J. Azbe at the 19th annual convention of the National Lime Association, Chicago, Ill., May 12, 1937.

LIME-KILN DRAFT AND POWER REQUIREMENT

THE DRAFT REQUIREMENTS of different kilns for a given production vary greatly. This variation may be due to excessive air supply for the amount of fuel burned or abnormal resistance created by the packing of lime or overly small and uniformly sized stone. It also is affected one way or the other by the difference in height of stone the gases have to pass through. How greatly the draft can vary on different kilns is shown in Fig. 1. However, this does not show the true difference because capacities of all these kilns per unit of shaft area are different, and the only way to create the true comparison is to adjust all of the draft readings to what they would be if all kilns were operated at the same capacity rate.

This adjustment can be accomplished if we select a standard, and in this case it is the Glen Park kiln, wherein stone is burned which has a normal initial size and is of normal crumbliness when converted to lime. The normal operation of this kiln also is one ton of lime per day per square foot of shaft area during the firing period. In Fig. 1 it will be noted that draft necessary to bring sufficient air through the cooler for complete combustion and for later disposal of products of combustion is very low and particularly so when considering that capacity is considerably higher per unit of size of any of the other kilns represented.

It is known that kiln capacity varies as the square of kiln draft; and that if the air induced is satisfied with its proper portion of combustible, kiln capacity will be double, when draft in a given kiln and under the same condi-

tions of resistance to flow is quadrupled. With this in mind, Fig. 1 can be adjusted so all of the kilns represented operate under the same rate of production, the results of which are shown in Fig. 2.

Of the kilns shown Glen Park is the only one operating at the capacity of a ton per square foot; in the other cases the draft given is what it would have to be to get this same capacity rate. In some cases it gets to be impractically high—in the Berkley instance particularly.

Curves Compared

A study of these curves is interesting; Ivanhoe resistance is about the same all through the kiln, indicating that its higher resistance (than Glen Park) is due either to the small size of stone or to too high a flow rate due to excess air. Glen Park and Ste. Genevieve kilns show an apparent lower resistance in the lime than in the stone sections of the kiln, this being because the draft here is enhanced by the draft effect of the high temperature section. Both these cases indicate a looseness in the lime section of the kiln. Contrary to all, Berkley shows extreme packing in the lime section; and a few feet of height in the hot zone draft drop is here more than in the entire height of the other kilns. This condition is entirely abnormal and due to the nature of the stone; it can be corrected only by a special kiln design that will create a looseness and permit a freer flow in both the cooler and hot zone sections of the kiln.

It may be that the Glen Park kiln is abnormal in its small draft requirements, but why that should be is not at all apparent to the writer, even after careful study of stone size and lime breakage, which appear the same as in

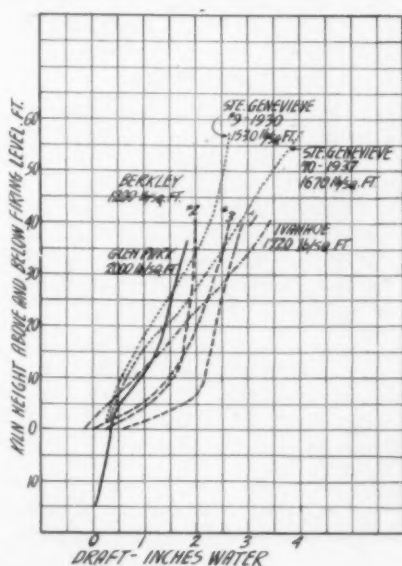
the St. Genevieve instance. Most likely it is that Glen Park operation is entirely normal while those at St. Genevieve and Ivanhoe need a higher draft due to higher excess air or higher stone charge. Reduced to Glen Park conditions draft necessary would not be much if any more. We may say that with lump lime a draft of $2\frac{1}{2}$ in. for a rate of a ton a square foot plus $\frac{1}{2}$ in. loss in connections to fan, or a total of 3 in. should be ample.

Power Requirements

We often find motors on fans of large kilns of 25 hp. size, and running so loaded as to be hot. Why is this power requirement so high, and what should the requirement be if good conditions are known and maintained?

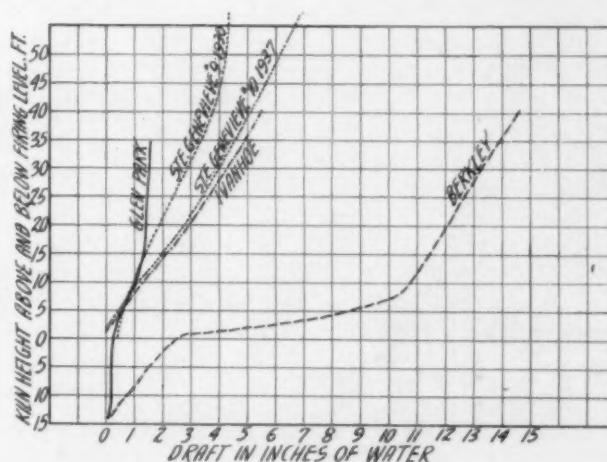
In the above discussion we established what draft we need, now we must determine the actual gas volumes and corresponding motor requirements.

A ton of lime a day is just about 40 cu. ft. of gaseous products of combustion and of CO_2 from the lime per minute. For a capacity of 60 tons the legitimate gas volume will be 2400 cu. ft., and with 20% excess air added, 2880 cu. ft. per minute, at the standard temperature of 68 deg. F. This gas has, however, to be handled hot; and if the kiln is drawn every three hours and charged every time it is drawn, the temperature of the gases coming through the kiln will fluctuate between 500 deg. F. after charging to 900 deg. F. before charging. Of course temperatures in the kiln are found much lower, but that is because they are diluted with cold air leaking in through imperfectly fitting charging gates. In some cases the fan has to handle half gas and half air, in one case actually 70 percent leakage air and only 30 percent kiln gas, which



LEFT — Draft requirements for five kilns having different capacities per unit of shaft area

RIGHT — Draft requirements for the same kilns, adjusted to represent the same rate of production per kiln



in the main is responsible for the abnormally high power requirements for the production of draft in lime kilns.

We cannot have absolutely tight kiln tops, but by use of proper charging gates, they can be made and maintained so tight that leakage will not exceed 30 percent of the kiln gas. With this leakage the total volume to handle would be 3740 cu. ft. at 68 deg. F.

Some 30 percent leakage will drop the 900 deg. F. kiln gas temperatures to 700 deg. F. Now it is possible to obtain fans that the manufacturer will guarantee to operate at these temperatures, and this without water-cooled bearings, but equipped with special vanes for air cooling. The same leakage will drop the 500 deg. F. gas to 395 deg. F., so the gas at the fan will fluctuate from 700 deg. F. to 395 deg. F., not considering the cooling in the ducts connecting the kiln to the fan.

The fan size evidently has to be proportioned to the hot gas, and 3740 cu. ft. at 68 deg. F. will have a volume of 8300 cu. ft. at 700 deg. F., while this same gas at 395 deg. F. will occupy 6170 cu. ft. If the fan would be a "Clarage Improved Exhauster," we have two likely choices No. 19 or No. 21, which would operate as given below:

No. 19 at 1340 r.p.m. with 8300 cu. ft. at 700 deg. F., using 7.7 hp.

No. 21 at 1150 r.p.m. with 8300 cu. ft. at 700 deg. F., using 7.1 hp.

No. 19 at 1340 r.p.m. with 6170 cu. ft. at 395 deg. F., using 8.1 hp.

No. 21 at 1150 r.p.m. with 6170 cu. ft. at 395 deg. F., using 7.5 hp.

It will be noted that the power is comparatively low and that in the cases of the cooler gases, it is not much different than with hot gas; but this desirable condition will only prevail if the damper is closed when the charge is made and the gas cools. If the damper remains the same with cool gas as it was with hot gas, the fan will handle a greatly increased weight of air, and not only the power will go up, but the kiln as well will be unbalanced by the uneven operating conditions.

Also, when the charging gate is open, the fan will be getting cold air, and the power may climb to several times the given figure. So steady draft on the kilns is not the only reason for having quickly opening and closing gates, the avoiding of overloading the fan motor is another important one.

The fan power given above applies to constant speed of fan operation and damper control. If fan speed could be reduced when the gases are cool the power required for 6170 cu. ft. at 3 in. and at 395 deg. F. would be:

No. 19 at 1130 r.p.m. 5.5 hp.

No. 21 at 977 r.p.m. 5.25 hp.

This great power reduction could be obtained with field control of d.-c.

motors where current is almost directly proportional to fan horse power. While with armature control or with alternating current there is virtually no gain in speed regulation.

It so seems that if proper precautions are taken all around, with kilns operated fairly, being frequently charged, top reasonably tight and gates quickly acting, that a fan as above connected to a 10-hp. motor would be ample even for the high rate operation of 60 tons to 60 sq. ft. of shaft. If more is used the cause should be located; it most likely will be found in leaky kiln tops and the fan handling disproportionate amounts of outside air.

Enlarges Plant

DOB LASUE LIME AND MINING CO., Republic, Wash., resumed production recently after the plant had been down for some time for repairs and enlargement.

City to Compete with Producers

DES MOINES, IOWA, street commissioner John MacVicar, is planning to build a plant to supply crushed stone, sand and gravel for the city's new municipal sewage disposal plant despite the opposition of local sand and gravel dealers. MacVicar contends that by the expenditure of a few thousand dollars the city can erect a plant that will save the city close to \$200,000. It is planned to dismantle the plant when the project is completed.

Asks River Permit

WEST VIRGINIA SAND AND GRAVEL CO., Charleston, W. Va., has applied for a permit to construct a movable loading platform and an incline track on a bank of the Elk river in Charleston.

Opens New Plant

GRAND RIVER LIMESTONE PRODUCTS CO., formally opened its plant near Miami, Okla. on July 29 with an address by L. W. Osborn, extension soil specialist of Oklahoma A and M college on the uses and value of agricultural stone to the soil. Officers of the company invited farmers to bring samples of their soil to be analyzed by Mr. Osborn. The plant has a capacity of 10 tons of agricultural limestone per hour.

Increasing Stone Capacity

WASHINGTON-IDAHO LIME PRODUCTS CO., Spokane, Wash., was recently preparing to open its Jordan lime plant near Orofino, Idaho, after installing crushing and screening machinery to increase the plant's capacity.

Sand-Lime Brick Production and Shipments

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States. They may be considered representative of the industry.

Nine active sand-lime brick plants reported for the month of July, and eleven active plants for the month of June, statistics for which were published in August.

Average Prices for May

Shipping Point	Plant Price	Delivered Price
Pontiac, Mich.	\$13.50	\$14.50
Mishawaka, Ind.	9.75	—
Syracuse, N. Y.	—	16.00 -20.00
Saginaw, Mich.	10.90	—
Grand Rapids, Mich. ..	11.00	—
Minneapolis, Minn.	10.00	12.00

Statistics for June and July

	June†	July*
Production	4,170,865	3,177,050
Shipments (rail)	659,262	412,000
Shipments (Truck)	3,663,777	2,643,417
Stock on hand	4,136,385	2,940,912
Unfilled orders	3,070,000	1,024,588

†Eleven plants reporting; incomplete, five not reporting unfilled orders.

*Nine plants reporting; incomplete, three not reporting unfilled orders.

Sand-Lime Products Manufacturers Meet

GREAT LAKES SAND-LIME PRODUCTS MANUFACTURERS, comprising manufacturers of sand-lime products in the Great Lakes area, held a meeting July 29 at Lansing, Mich. Twelve manufacturers were present at the luncheon and remained to take part in the discussion of various matters of interest.

Sand-Lime Brick Demand Increases

THE BELT LINE BRICK AND FLOORING CO., Minneapolis, Minn., has had a successful season in the sale of sand-lime brick. In recent years a number of white colonial houses in Minneapolis have been constructed of sand-lime brick.

Catalog on Drill Steels

SKF STEELS, INC., New York, N. Y., has released a 44-page well-illustrated catalog on drill steels written in a non-technical style for the benefit of practical men who use drill steel. A free copy may be obtained on request from SKF Steels, Inc., 369 Lexington Ave., New York, N. Y.

Expansion

AUSTIN CONCRETE WORKS, Austin, Tex., is installing machinery to make reinforced-concrete pipe up to 42-in. diameter.

NATIONAL ASSOCIATION *Activities*

Sand and Gravel

EXECUTIVE SECRETARY AHEARN, upon being officially advised by the U. S. Bureau of Mines of the winners of the annual sand and gravel safety contest in 1936, congratulated the winners and advised them that the trophy provided by ROCK PRODUCTS would be officially awarded at the 22nd annual convention of the association in Cincinnati during the week of January 31.

The Oxford-Fuller plant of the American Aggregates Corp., at Oxford, Mich., is the winner for plants working 100,000 man-hours or more during the calendar year 1936. This plant operated 118,328 man-hours in 1936 with eight lost-time accidents causing 54 days of disability.

The Orange No. 14 plant of the Consolidated Rock Products Co., Los Angeles, Calif., for its record of no lost-time accidents, is the winner for plants working less than 100,000 man-hours. Seven plants in this classification were awarded honorable mention.

THE RESEARCH COMMITTEE headed by A. W. Dann has already swung into action and has exchanged much correspondence relative to bringing the research activities of the association back to a more normal basis so that more of the problems requiring study and investigation might be undertaken. The committee was appointed by the Board of Directors at the recent Buffalo meeting. It is anticipated that the committee will meet in Washington soon to outline definite plans for the consideration of the board relative to greatly expanding present activities in the laboratory. Considerable study is being undertaken to determine which of the problems under consideration should be undertaken first.

Stanton Walker is preparing a paper for the coming annual convention discussing the current practices of state highway departments with respect to the use of gravel in bituminous mixtures and will welcome the assistance of members of the association in the form of letters telling their experiences in furnishing gravel for such work.

Mr. Walker has been very busy in the field during the past month, having visited in Indianapolis; Purdue University, where an investigation involving highway materials is in progress; Chicago; Springfield, Ill.; St. Louis, Mo.; and Raleigh, N. C. At Raleigh he ap-

peared before the highway commission in company with local producers in behalf of the wider use of gravel in bituminous mixtures. The next few months will be very busy ones for Mr. Walker in preparing for the annual association meeting and in attending various committee meetings.

Crushed Stone

ADMINISTRATIVE DIRECTOR BOYD has been keeping close touch with developments on the political horizon in Washington and particularly with reference to changes in the amended Black Bill on minimum wages and maximum hours.

Mr. Boyd reports that plans for the Twenty-first annual convention of the association to be held in Cincinnati, January 24, 25 and 26, 1938, are already in the process of formulation. Full and detailed information on the program will be made available to members as soon as the meeting takes shape.

Ready-Mixed Concrete

DIRECTOR OF ENGINEERING STANTON WALKER, in Technical Information Letter No. 5 mailed to member companies, outlined revisions to ready-mixed concrete standards adopted at the recent annual meeting of the American Society for Testing Materials. These revisions, for the most part, were made for the purpose of clarifying and making more definite certain of the requirements. All revisions were itemized and member companies were invited to comment upon them.

In accordance with authorization of the executive committee, at its annual meeting held in Buffalo, a committee has been appointed to study the desirability of developing standards and recommended practices covering types of truck mixers other than those of the revolving drum type. It is expected that this committee will make recommendations to the already existing committee on standards in time for consideration before the next annual convention to be held in Cincinnati the week of January 31, 1938. T. H. Fleming, Concrete Transport Mixer Co., St. Louis, Mo.; Herbert Jahncke, Jahncke Service, Inc., New Orleans, La.; R. F. Powell, Fred Schmitt Material Co., St. Louis, Mo.; D. B. Thornton, Cromer and Thornton, Inc., Atlanta, Ga.; R. B. Young, Ready Mix Concrete, Ltd., Montreal, Canada and

Stanton Walker have been invited to serve on the committee.

The association has a list of 572 ready-mixed concrete producers on hand, of which 223 replied to a questionnaire mailed out for the purpose of recording trends in ready-mixed concrete production. The remarkable growth of the industry is apparent, with returns from 223 producers showing an approximate annual production of 6,000,000 cu. yd. This figure exceeds earlier estimates for the industry as a whole.

Lime

SECRETARY W. V. BRUMBAUGH mailed a questionnaire to all member companies to obtain helpful suggestions to aid in formulating the best possible program for the 1938 convention of the association. Already titles for eight papers covering manufacturing problems have been suggested. Such papers were received with great enthusiasm at the 1937 convention, and if there is enough interest shown, an extra day will be set aside for these papers, so as not to curtail other features of proven interest.

National Safety Congress at Kansas City

THE 26TH NATIONAL SAFETY CONGRESS AND EXPOSITION to be held at Kansas City, Mo., from October 11 to 15 will be attended by 10,000 men and women according to advance indications. More than 400 speakers will discuss accident prevention in industrial plants, in the home, on the streets and highways and in fact every conceivable place where an accident might occur. This annual meeting, sponsored by the National Safety Council, will attract accident prevention experts from every corner of the United States and several foreign countries.

Sessions will be held in the new air-conditioned Municipal Auditorium and a display of equipment for safeguarding operations of all kinds will be housed in the exhibition hall of the auditorium.

Separate programs have been arranged for industries in more than 30 sections including cement, chemical, construction, mining, public utilities and others. Other sessions will be devoted to after-work accidents, fire prevention, industrial dusts, community safety organization, health service in industry and other topics.

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends	Stock	Date	Bid	Asked	Dividends
Aetna P. C., cap. ³¹	8-25-37	24	25		Minnesota Mining & Mfg. Co.....	8-25-37	26 1/4	39	
Allentown P. C. (Penn.), com. ³¹	8-24-37	6	..		Missouri P. C.....	8-25-37	..	19	
Allentown P. C. (Penn.), 6% cum. pfd. ³¹	8-24-37	9 1/2	..		Monarch Cement, cap. ³¹	8-24-37	100	..	4%
Alpha P. C., com. ³¹	8-25-37	22 1/2	24	.25	Monolith P. C., com. ³¹	8-25-37	3 1/2	..	July 1
American Aggregates, 1st mtg. ³¹	8-16-37	70	..		Monolith P. C., 8% pfd. ³¹	8-25-37	7 1/2	8 1/2	.25 Aug. 15
3/6's 1913, new bonds ³¹	8-16-37	72	..		Monolith Portland Midwest, pfd. ³¹	8-25-37	..	..
American Aggregates, 6% 1945, old ³¹	8-16-37	70	..						
American Aggregates, com. ³¹	8-16-37	1	4		National Gypsum, A., com. ³¹	8-25-37	12 1/2	13	
American Aggregates, pfd. ³¹	8-16-37	16	..		National Gypsum, 7% pfd. ³¹	8-25-37	..	..
Arundel Corp., com. ³¹	8-25-37	21 1/2	..		National Gypsum, 5% pfd. ³¹	8-25-37	16 1/2	18	
Ash Grove L. & P. C., com. ³¹	8-24-37	13	..		National L. & S., 6 1/2's, 1941 ³¹	8-16-37	92	..	
Ash Grove L. & P. C., pfd. ³¹	8-24-37	98	..		Nazareth Cement, com. ³¹	8-17-37	9	11	
					Nazareth Cement, 7% pfd. ³¹	8-17-37	90	100	
Bessemer L. & C., com. ³¹	8-16-37	8	8 1/2		Newaygo P. C., pfd. ³¹	8-24-37	90	..	
Bessemer L. & C., pfd. ³¹	8-16-37	30	31		New England Lime, units ³¹	8-14-37	19	22	
Bessemer L. & C., 1st 6 1/2's, 1947 ³¹	8-16-37	93	97		N. Y. Trap Rock, 6's, stamped, 1946.....	8-16-37	75	..	
Bessemer L. & C., 6 1/2's, 1955 ³¹	8-16-37	95	97		N. Y. Trap Rock, 7% pfd. ³¹	8-16-37	51	53	
Boston S. & G., com. ³¹	8-16-37	1	2		North Amer. Cement, 6 1/2's, 1953 ³¹	8-17-37	7 1/2	9	
Boston S. & G., 7% pfd. ³¹	8-16-37	7	10		North Amer. Cement, com. ³¹	8-17-37	6	7	
Boston S. & G., 7's 1939 ³¹	8-16-37	80	..		North Amer. Cement, 6 1/2's, 1946 ³¹	8-17-37	94	98	
					North Amer. Cement, 6 1/2's, 1943 ³¹	8-17-37	13	14	
Calaveras Cement, com. ³¹	8-16-37	7 1/2	8		North Amer. Cement, "B" pfd. ³¹	8-17-37	48	..	
Calaveras Cement, 7% pfd. ³¹	8-16-37	93	96		North Shore Mat., 1st 6's ³¹	8-17-37	..	..
California Art Tile, A.....	8-23-37	16 1/2	16 1/2	1.50	Northwestern P. C., units ³¹	8-17-37	27	30	
California Art Tile, B.....	8-23-37	9	9		Northwestern P. C., pfd. ³¹	8-17-37	..	..
Canada Cement, com. ³¹	8-24-37	15 1/2	15 1/2		Northwestern States P. C. ³¹	8-17-37	..	..
Canada Cement, pfd. ³¹	8-24-37	109 1/2	110 1/2	1.25					
Canada Cement, 4 1/2's, 1951 ³¹	8-24-37	103	104		Ohio River S. & G., com. ³¹	8-25-37	1	..	
Canada Crushed Stone, 2 1/2's, 1948 ³¹	8-24-37	100	..		Ohio River S. & G., 1st pfd. ³¹	8-25-37	79	..	
Carolina P. C., 8% cum. pfd. ³¹	8-24-37	42	..		Ohio River S. & G., 2nd pfd. ³¹	8-25-37	5	..	
Consol. Cement A.....	8-24-37	6 1/2	7 1/2		Ohio River S. & G., 6's ³¹	8-16-37	12	..	
Consol. Cement, 1st 6's 1948 ³¹	8-17-37	80	82		Oregon P. C., com. ³¹	8-16-37	9 1/2	4 1/2	
Consol. Okla. S. & G., 6 1/2's 1948 ³¹	8-24-37	..	32		Oregon P. C., 1st pfd. ³¹	8-16-37	90	..	
Consol. S. & G. pfd. ³¹	8-17-37	1	1 1/2		Oregon P. C., conv. pfd. ³¹	8-17-37	55 1/2	57 1/2	
Consol. Rock Products, units ³¹	8-17-37	..	..				
Consumers R. & G. 1st Mtg., 6's 1948 ³¹	8-24-37	35 1/2	38 1/2		Pacific Coast Agr., new com. ³¹	8-16-37	2.85	2.95	
Cocoa P. C., 1st 6's ³¹	8-24-37	50	..		Pacific Coast Cement, com. ³¹	8-24-37	OW	..	
Coplay Cement Mfg., pfd. ³¹	8-17-37	12	..		Pacific Coast Cement, 1st pfd. ³¹	8-24-37	OW	..	
Coplay Cement Mfg., 6's 1941 ³¹	8-17-37	92	..		Pacific P. C., com. ³¹	8-16-37	3.25	4.90	
Cumberland P. C., units ³¹	8-24-37	74 1/2	..		Pacific P. C., pfd. ³¹	8-16-37	51 1/2	55	
Cumberland P. C., 7's, 1937 ³¹	8-24-37	57	..		Pacific P. C., com. ³¹	8-17-37	4 1/2	5 1/2	
					Penn.-Dixie Cement, com. ³¹	8-25-37	6 1/2	6 1/2	
Dewey P. C., com. (new) ³¹	8-24-37	20 1/2	22 1/2		Penn.-Dixie Cement, pfd. A.....	8-25-37	42	48	
Diamond P. C. ³¹	8-14-37	15 1/4	16	.25	Penn.-Dixie Cement, 6's A, 1941.....	8-25-37	24 1/2	26 1/2	.25 Oct. 1
Dulles & Shepard.....	8-25-37	39	42		Penn. Glass Sand Corp., v.l.e. ³¹	8-25-37	..	..
					Penn. Glass Sand Corp., pfd. ³¹	8-24-37	8 1/2	9 1/2	
Federal P. C., 5's 1947 ³¹	8-24-37	62	..		Potosky P. C., com. ³¹	8-24-37	..	..
Federal P. C., 6's, 1941.....	8-17-37	37	39						
Fla. P. C., units ³¹	8-16-37	100	101		Republic P. C., com. ³¹	8-24-37	10 1/2	11 1/2	
Fla. P. C., 6 1/2's 1937 ³¹	8-16-37	..	..		Riverside Cement, A.....	8-25-37	15	15	.25 Aug. 1
					Riverside Cement, B ³¹	8-16-37	94	96	1.50 Aug. 1
Giant P. C., com. ³¹	8-17-37	2 1/2	3 1/2		Riverside Cement, pfd. ³¹	8-24-37	OW	..	
Giant P. C., pfd. ³¹	8-17-37	13 1/2	14		Rockland & Rockport Lime, com. ³¹	8-24-37	..	..
Glens Falls P. C., com. ³¹	8-24-37	12 1/2	14 1/2						
Glens Falls P. C., pfd. ³¹	8-24-37	80	92		Santa Cruz P. C., pfd. ³¹	8-23-37	53	39	
Great Lakes P. C., B ³¹	8-24-37	1 1/2	..		Schumacher Wallboard, com. ³¹	8-23-37	3	5	
Gyp. Lime & Alabastine, 5 1/2's, 1948 ³¹	8-25-37	12 1/2	13 1/2	actual sale	Schumacher Wallboard, pfd. ³¹	8-23-37	21	22	.50 Aug. 16
		101 1/2	102 1/2		Signal Mt. P. C., com. ³¹	8-17-37	2 1/2	4	
					Signal Mt. P. C., pfd. ³¹	8-17-37	74 1/2	76	
Hawkeye P. C., cap. ³¹	8-17-37	35	..		Signal Mt. P. C., units ³¹	8-24-37	76	80	
Hercules Cement, com. ³¹	8-24-37	56	62		Southern States P. C., cap. ³¹	8-24-37	38	..	
Hermitage P. C., com. ³¹	8-24-37	..	..		Southwestern P. C., units ³¹	8-16-37	190	..	
Hermitage P. C., pfd. ³¹	8-24-37	..	..		Standard Pav. & Mat., com. ³¹	8-24-37	4 1/2	5 1/2	
					Standard Pav. & Mat., pfd. ³¹	8-24-37	..	..
Ideal Cement, com. ³¹	8-17-37	20 1/2	20 1/2		Spokane P. C., units.....	8-24-37	no market	..	
					Standard Sillix.....	8-24-37	..	..
Kelley Island L. & T.....	8-25-37	23 1/2	24 1/2		Superior P. C., pfd. ³¹	8-16-37	42 1/2	..	.27 1/2 Sept. 1
Ky. Rock Asphalt, 6 1/2's, 1936 ³¹	8-16-37	40	..		Superior P. C., A ³¹	8-16-37	18 1/2	19 1/2	.27 1/2 Sept. 1
Ky. Stone Co., v.l.e. ³¹	8-16-37	4 1/2	..		Superior P. C., B ³¹	8-16-37	..	..
Ky. Stone Co., 5's, 1956 ³¹	8-16-37	45	..						
Keystone P. C., pfd. ³¹	8-24-37	32 1/2	..		Trinity P. C., units ³¹	8-17-37	82	..	
Lawrence P. C., com. ³¹	8-17-37	31	33		U. S. Gypsum, com. ³¹	8-25-37	110	115	.50 Oct. 1
Lawrence P. C., 5 1/2's, 1942 ³¹	8-17-37	100 1/2	102 1/2		U. S. Gypsum, pfd. ³¹	8-25-37	160	165	1.75 Oct. 1
Lehigh P. C., com. ³¹	8-25-37	29 1/2	32	.37 1/2 (qu.) Nov. 1					
Lehigh P. C., 4% pfd. ³¹	8-25-37	..	170		Volunteer P. C., 1st 7's, 1942 ³¹	8-16-37	90	..	
Lone Star Cement, com. ³¹	8-25-37	53	53 1/2		Volunteer P. C., units.....	8-16-37	9 1/2	11 1/2	
Louisville Cement.....	8-25-37	44	47		Vulcanite P. C., com. ³¹	8-16-37	96	..	
Lyman-Richey, 1st 6's, 1939-40 ³¹	8-24-37	68	..		Vulcanite P. C., 7 1/2's, 1943 ³¹	8-16-37	..	..
Marbelite Corp., com. ³¹	8-16-37	..	1 1/2		Wabash P. C. ³¹	8-17-37	10	15	
Marbelite Corp., pfd. ³¹	8-16-37	4	5		Warner Co., vw. 1st 6's, 1944 ³¹	8-16-37	92	..	
Marblehead Lime, 7's, 1944 ³¹	8-14-37	97	..		Warner Co., com. ³¹	8-17-37	11	12 1/2	
Marquette Cement, com. ³¹	8-25-37	43	44		Warner Co., pfd. ³¹	8-17-37	20	23	
Marquette Cement, pfd. ³¹	8-17-37	183	187		Whitehall Cement Mfg., com. ³¹	8-24-37	OW	..	
Material Service Corp. ³¹	8-17-37	18	19		Whitehall Cement Mfg., pfd. ³¹	8-24-37	OW	..	
McCready-Rodgers, com. ³¹	8-17-37	6	10		Wisconsin L. & C., 1st 7's, 1940 ³¹	8-14-37	85	..	
McCready-Rodgers, 7% pfd. ³¹	8-17-37	30	37		Wolverine P. C., com. ³¹	8-23-37	4 1/2	4 1/2	
Medusa P. C., com. ³¹	8-25-37	34	40	1.00 July 1					
Medusa P. C., 6% cum. pfd. ³¹	8-24-37	98	104	1.50 July 1	Yosemite P. C., 4% pfd. ³¹	8-16-37	4	4 1/2	
Michigan L. & C., com. ³¹	8-24-37	OW	..						

Quotations by *A. E. White Co., San Francisco, Calif. ³¹The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. ³²Wise, Hobbs & Seaver, Inc., Boston. ³³Martin Judge Jr., and Co., San Francisco, Calif. ³⁴Nesbitt, Thomson & Co., Ltd., Toronto, Ont. ³⁵First National Bank of Chicago, Chicago, Ill. ³⁶Hewitt, Ladin & Co., New York, N. Y. ³⁷Rogers & Tracy, Inc., Chicago, Ill. ³⁸Paul D. Sheeline & Co., Boston, Mass. ³⁹Merrill, Turber & Co., Cleveland, Ohio.

RECENT DIVIDENDS ANNOUNCED

California Art Tile A.....	\$1.50	Sept. 1
Canada Cement, pfd.....	1.25	Sept. 20
Lehigh Portland Cement (quar.) .....	.37½	Nov. 1
Monolith P. C., 8%.....	.25	Aug. 15
Penn. Glass Sand Corp., v.c.t.	.25	Oct. 1
Schumacher Wallboard, pfd....	.50	Aug. 16
Superior P. C., pfd.....	.27½	Sept. 1
Superior P. C., A.....	.27½	Sept. 1
Superior P. C., B.....	.27½	Sept. 1
U. S. Gypsum, com.....	.50	Oct. 1
U. S. Gypsum, pfd.....	1.75	Oct. 1

ALPHA PORTLAND CEMENT CO., Easton, Penn., reports for the 12 months ended June 30, 1937, subject to audit and year-end adjustments, net profit of \$690,980 after federal income taxes, depreciation, depletion, etc., equivalent to \$1.07 a share on 664,600 no-par shares of capital stock. No provision has been made for surtax on undistributed profits. For the 12 months ended June 30, 1936, company reported profit of \$259,907 after charges but before federal income or undistributed profits taxes.

Consolidated income account for 12 months ended June 30, 1937, compares as follows:

	1937	1936
Net sales	\$7,021,700	\$5,883,559
Operating expenses	5,129,513	4,525,859
Depreciation and depletion	1,172,574	1,202,557
Operating income	\$719,613	\$155,143
Other income	142,314	145,357
Total income	\$861,927	\$300,500
Charges	36,596	41,270
Federal income taxes.....	134,351	.....
Profit	\$690,980	\$259,230
Minimum interest (credit) .....	.....	677
Net profit	\$690,980	\$259,907
Preferred dividends .....	.....	.....
Common dividends	805,750	644,600
Deficit	\$114,770	\$384,693

* Loss. † Profit before federal income and undistributed profits taxes.

REPUBLIC PORTLAND CEMENT CO., San Antonio, Tex., reports for the six months ended June 30, 1937, net earnings:

*Net profit	\$219,547
Preferred dividends	70,334
Common dividends	124,790
Surplus for period	24,423
Surplus, December 31, 1936.....	307,336
Tax adjustment, etc.	157
Reserve for preferred retirement.....	11,266
Earned per share, common	0.77
Surplus, June 30, 1937.....	320,336
Earned per share, 5% preferred.....	\$19.49

* After depreciation, depletion, Federal income taxes, etc.

Current assets as of June 30, 1937, were \$791,700; current liabilities, \$148,638.

NATIONAL GYPSUM CO., Buffalo, N. Y., reports for the six months ended June 30, 1937, net profit of \$509,880 after depreciation, depletion, interest, federal and Canadian income taxes, etc., but before surtax on undistributed profits,

equivalent after dividend requirements 7% first preferred and 5% second preferred stocks, to 30 cents a share (par \$1) on 1,174,382 shares of common stock.

This compares with \$408,382 or 23 cents a common share, based on above capitalization, in first half of 1936.

Consolidated income account for six months ended June 30, 1937, follows: Profits from operations \$740,629; depreciation and depletion \$97,277; operating profit \$643,352; other income \$32,060; total income \$675,412; interest \$47,875; reserve for doubtful accounts \$34,657; federal and Canadian income taxes \$83,000; net profit \$509,880.

Sales during the first half of the year were satisfactory but profit margins were substantially reduced through advance in labor and material costs. M. H. Baker, president, stated. Estimates now set up for the last half of the year, he added, reflect improvement in both costs and sales.

TRINITY PORTLAND CEMENT CO., Dallas, Tex., reports for the years ended December 31:

	1936	1935
Net sales	\$2,357,109	\$1,241,581
Cost of sales	1,109,359	634,896
Gross profit	1,247,750	606,684
Selling, etc., expenses.....	373,404	259,041
*Mill overhead	272,878	298,845
Net operating income.....	601,468	48,798
Margin of profit.....	25.52%	3.93%
Other income	42,003	33,637
Total income	643,472	82,435
Interest charges, etc.....	40,186	73,557
Federal income taxes.....	56,000	.....
Federal surtax	44,000	.....
*Net profit	503,285	8,878
Preferred dividends	87,330	.....
Surplus for year.....	415,955	8,878
Earned per share, preferred	\$28.82	\$0.51
Earned per share, common	25.40	(d)7.56

* Applicable to non-operating periods. † Before adjustment applicable to prior years: 1936, \$57,583; 1935, (cr)\$43,669.

Note: Above income account includes depreciation of buildings and equipment: 1936, \$242,941; 1935, \$253,616; and depletion of quarry lands: 1936, \$3,114; 1935, \$2,075.

Current assets as of December 31, 1937, were \$1,137,654; current liabilities, \$270,113.

LIMESTONE PRODUCTS CORP. OF AMERICA, Newton, N. J., reports for the years ended December 31:

	1936	1935
Sales	\$327,217	\$202,091
Cost of sales	156,090	74,347
Operating expenses	109,243	84,924
Depreciation	36,431	35,435
Depletion	4,466	2,752
Reserve for bad debts.....	3,272	2,704
Operating profit	17,715	1,029
Other income	3,050	2,483
Total	20,765	4,412
Bond interest	11,788	11,886
Other interest	7,411	.....
Bond discount	1,702	177
Net loss	136	7,651
Earned per share, com.....	(d)\$1.43	(d)\$1.82

Current assets as of December 31, 1936, were \$119,130 and current liabilities, \$31,291.

BASIC DOLOMITE, INC., Cleveland, Ohio, is offering through a group of brokers in Cleveland, New York and Chicago, 140,000 shares of common stock, par value \$1, at \$12.50, which includes an underwriting cost of \$1.50 per share. The stock will be listed on the Curb Exchange, New York City. The company is engaged chiefly in the manufacture of sintered dolomite for steel furnace refractories—under the trade names "Magnefer" and "Syndalog." The principal plant is at Maple Grove, Ohio, another is at Bettsville, Ohio. At Peebles, Ohio, is another quarry and crushing plant. The net proceeds from the sale of the common shares offered, after deducting expenses payable by the company in connection therewith, will be about \$1,470,875 and will be used to redeem its outstanding funded debt, to pay the balance of the rentals due under the lease on a plant and to provide additional working capital.

Income account for 12 months ended December 31, 1936, compares with the five months to May 31, 1937 as follows:

	5 mos. to May 31, 1937	Year to Dec. 31, 1936
Net sales	\$968,968	\$2,057,681
Cost of sales	594,678	1,291,347
Expenses	125,734	287,812
Depreciation and depletion	35,655	78,841
Operating profit	212,903	399,681
Other income	4,505	9,015
Total income	217,408	408,696
Bond interest, etc.	29,892	79,702
Income taxes	26,000	50,000
Net profit	161,516	278,994
*Earned per share.....	\$0.77	\$1.33

* Based on 210,000 shares.
Note: No provision made for Federal surtax.

CONSOLIDATED CEMENT CORP., Chicago, Ill., reports earnings for the 12 months ending June 30 as follows:

	1937	1936
Net sales	\$1,501,693	\$1,128,911
Cost of sales.....	873,915	671,299
*Selling and administrative expenses, etc.....	372,503	343,427
Operating profit	255,275	114,185
Bond and note interest.....	112,946	119,965
Bond discount and expense	9,982	10,589
Loss on assets retired, etc.	5,827	8,386
*Net income	126,720	(d)24,755
Times charges earned.....	2.08	0.87
Earned per share, cl. A.....	\$1.26	(d)\$0.25

* Includes expense applicable to non-operating periods (less miscellaneous income). † After depreciation and depletion \$168,118 (1936, \$159,003).

GREAT LAKES PORTLAND CEMENT CORP., Buffalo, N. Y., reports for the years ended December 31:

	1936	1935
Sales	\$1,471,933	\$1,035,618
Costs and expenses	1,078,260	792,535
Depreciation and depletion	206,426	266,947
Operating profit	187,239	(d)23,864
Other income	5,592	5,314
Total income	192,831	(d)18,550
Interest	11,893	21,891
Federal income tax.....	26,030	.....
Net income	154,908	(d)40,441
Dividends	178,416	.....
Deficit for year.....	23,509	40,441
Earned per share, cl. A.....	\$3.47	Nil
Earned per share, cl. B.....	(d)\$3.99	(d)\$8.89

HINTS AND HELPS FOR SUPERINTENDENTS

Keep the Wheels Going

By C. O. GRANGER,
Superintendent, Chas. H. Young Co.,
Minneapolis, Minn.

BY MAKING A FEW MINOR CHANGES in a large washed sand and gravel plant we were able to make a product which conformed to specifications for a job in our city for which material had previously been shipped from another state.

The pit runs 15 percent over 3 in. in size, which we scalped off and crushed down, making a 100 percent angular crushed gravel. Our ability to produce this material procured for us a nice job.

The pit run material was hauled in trains of eight cars, each having a capacity of 6 cu. yd., to a hopper and dumped to a mechanical grizzly with 3-in. openings. Sand and gravel passing these openings goes to a 36-in. belt conveyor, and rejected material goes into a 36-x 41-in. jaw crusher set at about 6-in. opening.

The crushed gravel goes to the same 36-in. belt conveyor and is carried to a jacketed scalping screen of 7-ft. diameter and 20 ft. long, equipped with a 15-ft. section of screen with 3-x3-in. openings, and a 5-ft. section of 3-x7-in. openings. (These sections are cast manganese steel $\frac{3}{4}$ in. thick with 3-x 3-in. openings; cutting out cross bars makes a 3-x7-in. opening.)

Material which passes a 3-x7-in. opening goes to a 3-ft. Symons cone crusher; material rejected goes to a No. 13 McCully crusher, then into the

Symons, which is set to make a $1\frac{1}{4}$ -in. product, then chuted to a bucket elevator which carries the 100 percent crushed product to a 4-x20-ft. revolving screen equipped with three sections; the first 8 ft. long of No. 9 wire with $\frac{1}{4}$ -x $\frac{1}{4}$ -in. opening, which has numerous water jets playing on it to wash material. The second section is 6 ft. long, made of 3/16-in. wire with $\frac{3}{4}$ -x $\frac{3}{4}$ -in. opening, which gives us a $\frac{3}{4}$ -in. product; and the third section is 6 ft. long, made of $\frac{1}{4}$ -in. wire with $1\frac{1}{2}$ -x $1\frac{1}{2}$ -in. opening, which gives us a $1\frac{1}{4}$ -in. product. These two sizes go into separate bins to be mixed in loading as needed. The rejected material, which is very little, goes back to the crushers.

The change necessary to make this product was installing a cone crusher. This increased our production over the old reduction crushers, shutting down one, sometimes two of them. The bucket elevator and 4-ft. revolving washing screen, that we used, were part of the plant which had not been in use for some years, having been replaced with more modern equipment.

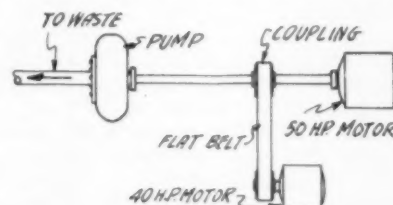
Emergency Pump Drive

WHEN THE WESTERN SAND AND GRAVEL Co., Lincoln, Neb., burned out a 100-hp. d.-c. motor, two smaller motors were pressed into service to do the work of the larger motor until it could be replaced.

The company had limited storage space and was wasting the fine sand from two 8-in. pumps through a 6-in.

Wilfley pump. The 100-hp. motor driving the 6-in. pump burned out and a replacement was necessary while the motor was being re-wound.

Two smaller motors on hand were pressed into service. A 50-hp. d.-c. motor was direct-connected to the shaft.



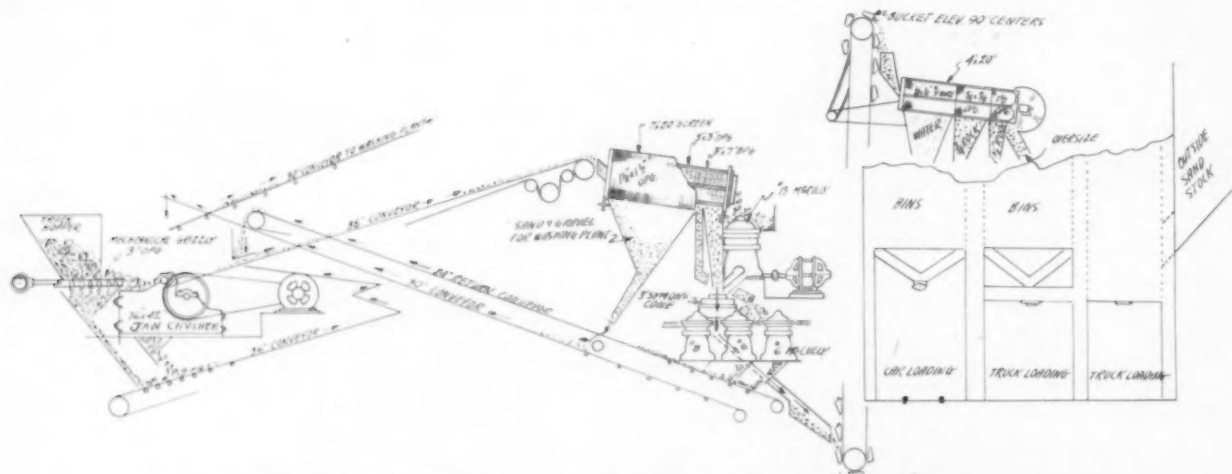
Emergency pump drive with two motors

A 40-hp. d.-c. motor was connected by flat belt to the flexible coupling between the 50-hp motor and the pump. By connecting both to the same starting box and starting them simultaneously, the two motors combined successfully took the place of the larger one, which was over-rated.

Lengthening Screen Life

By ROSS WHEELTON,
Aldershot, Ont.

ON A POPULAR MAKE of vibrating screen the screen cloths are supported on cross bars of steel over which is placed a strip of grooved rubber. When the screen cloth is fastened down tightly against these rubber strips it should and does give no trouble until worn out. If, however, upon replacement of the screen cloth the old rub-



A few minor changes and this plant could produce a 100% angular crushed gravel to meet a particular specification

bers are not replaced with new ones, they may give out before the new screen and allow the cloth to strike the steel cross bars.

When this occurs the constant hammering of the screen cloth against the steel bars will cause the cloth to break at this point, and pieces of the cloth to fall out long before it has given its full service as can be seen in the accompanying illustration.



Illustrating screen cloth wear at points of support

Faster wear on the rubbers will be noticed where larger mesh cloth is used, therefore, it may not be necessary to replace the rubbers under the finer mesh cloth every time a new



Replacing rubber strips will prevent much of this wear

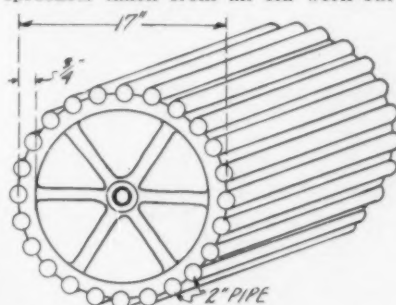
screen is fitted. However, the cost of new rubbers is so slight that they should be replaced where there is the least doubt of their not lasting longer than the screen cloth being installed.

Belt-Cleaning Pulley

A SNUB PULLEY of home-made design is used on a long belt conveyor at the Attica, N. Y., sand and gravel plant of the Buffalo Slag Co. to prevent

"gumming up" the belt with sticky clayey material; thus interfering with its passage over the take-up pulley.

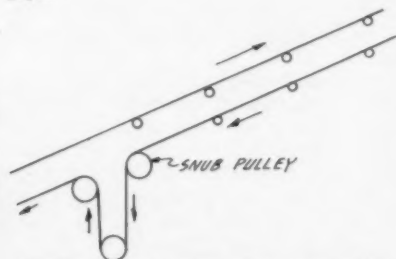
Two ordinary 17-in. diameter chain sprockets taken from an old worn-out



Improved snub pulley to reduce "gumming up" of belt

sand drag, and sections of 2-in. hollow steel, cut to the length desired for the pulley.

The sprockets have 17 circumferential grooves or teeth in each. Seventeen steel tubes or pipe, each cut to the length desired, are brazed or welded in the grooves, as indicated, to form a pulley shell with openings between the pipe.



Position of snub pulley when in operation

Now, since the new pulley has been installed, material which accumulates between the belt, on its return, and the snub pulley falls through the openings between the pipe to the ground. This pulley has been very successful in remedying an annoying condition.

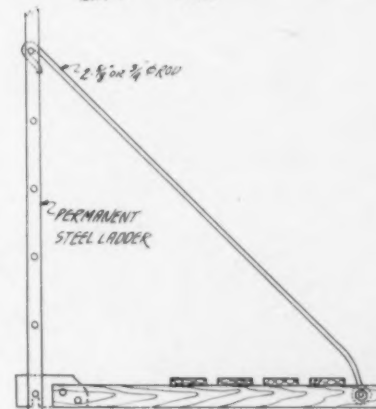
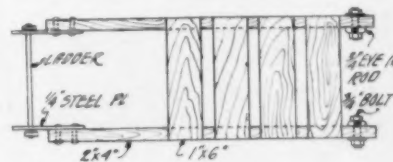
Safety Platform

By C. E. ENGELHARD,
Safety Supervisor,
Southwestern Portland Cement Co.,
El Paso, Tex.

OUR CRUSHING DEPARTMENT FOREMAN, R. W. Stafford, has developed a practical and safe device to assist in barring down rock which has become arched over the hopper feed. The accompanying sketch gives the design for construction. The lengths will vary according to the place it is to be used. This platform can be easily raised or lowered by setting it on the desired level on the ladder while being balanced and supported by the two rods which also can be set at the desired point.

This movable platform was designed chiefly for use in rock storage silos for

the convenience of the operator in barring down rock which may have become arched over the hopper outlet or stuck to the side walls. By no means does it eliminate the necessity of the safety belt and line attached to the operator or the presence of one or more helpers



Safety platform for barring down rock

above. It merely allows the use of both hands while performing the work.

The workman with safety belt sits straddle of the platform with legs under the side support rods. Both hands are free to use the punching rod.

If the silos or outside storage bins are not already equipped with permanent attached steel ladders, these can easily be made in the local shop and set up.

This plant has been fortunate in not experiencing a serious or fatal accident due to worker being caught in such a trap.

Eliminating Wear on Steel Chute

MEDUSA PORTLAND CEMENT CO., Wampum, Penn. plant, has solved simply the problem of wear on a steel chute used to discharge clinkers from its Peck conveyors to a recently-installed clinker cooler. This chute is about a foot wide and about 20 ft. long at an angle of about 30 deg. to the vertical. Sections of angle iron were fastened inside the chute to its bottom perpendicular to the direction of flow. These sections were so spaced that falling clinker would fill up the gaps between sections to a depth completely covering the steel chute bottom. Other clinker passing down the chute does not touch the metal and "rides" on a cinder bottom. The steel bottom shows no signs of wear.

Aggregates Handling for Rush Job at

SAN FRANCISCO'S WORLD'S FAIR

On Artificial Island Still Being Filled

TREASURE ISLAND is the name given to a 400-acre fill in San Francisco Bay, where the 1939 Golden Gate Exposition is to be held. After that it will serve as the city's airport. The airport terminal building and two hangars are now under construction and will serve temporarily as exposition buildings, but they are permanent structures requiring considerable concrete.

Handling cement and aggregates for this construction involved some difficulties, because placing concrete started while the island filling was still in progress. Eventually the island will be connected by a causeway with Yerba Buena Island and the Bay Bridge to San Francisco and Oakland, but at present the only access to the job is by water.

To handle the aggregates the contractor, Clinton Construction Co., erected

a 1-cu. yd. concrete mixing plant at the water's edge. Barges are unloaded by crane into an 11-yd. hopper feeding a Link-Belt conveyor. An 18-in. belt conveyor lifts the material 120 ft. to the storage bin at the rate of 800 yd. in eight hours. The storage bin, adjacent to the charging hopper, has a capacity of 400 yd. A bargeload of sand or gravel a day is easily handled by this system. Cement in bags is raised from the barge by a stiff legged derrick to the cement storage bin which has a capacity of 1000 barrels.

A planked road was constructed for hauling the mix to two central hoisting towers. Owing to the short distance to the job, four Ford trucks were able to keep up with the two minute schedule of the mixer. Rubber-tired dump buglies were used throughout the job.

According to W. P. Day, vice-president of the exposition and director of works, construction schedules on this vast project are being maintained. The 17,760 foot seawall, which required a total of 287,000 tons of rock has recently been completed. Over 1,000,000 sq. ft. of building space is now under construction.

Completing Cement Storage Plant

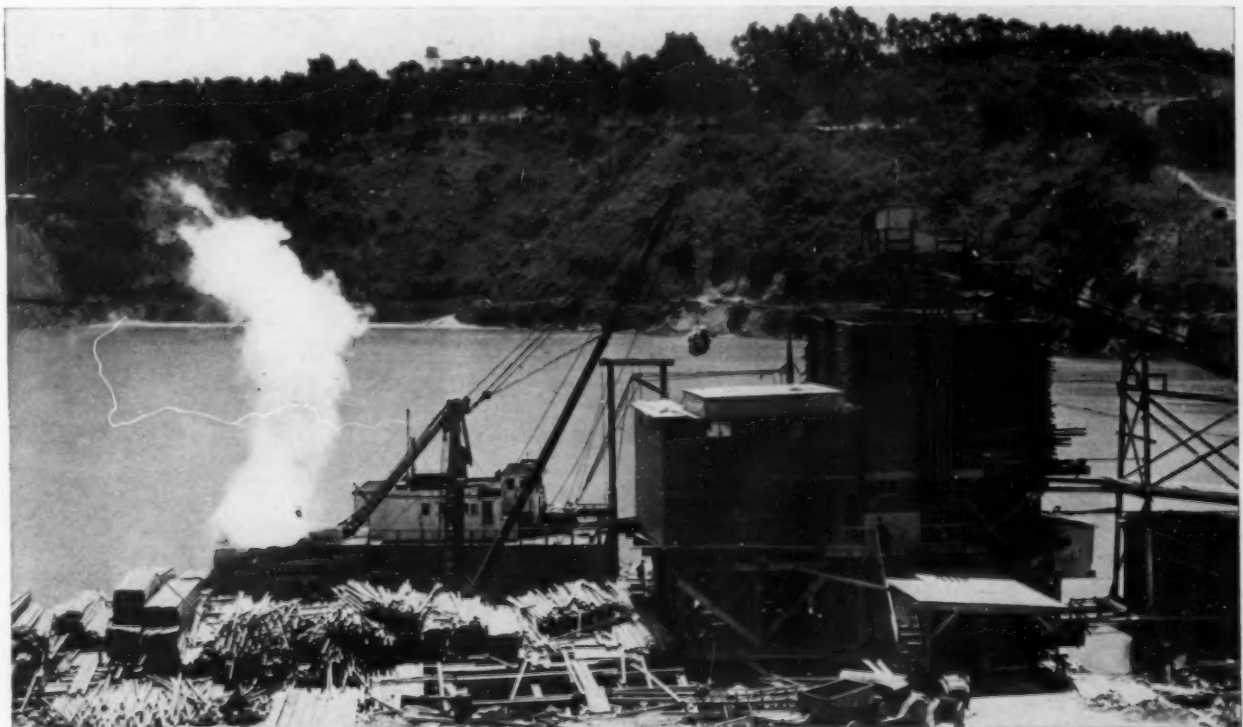
HURON PORTLAND CEMENT CO., Detroit, Mich., expects to complete its new \$100,000 storage plant and dock development at Muskegon, Mich., in September. Muskegon will be made the headquarters for the company's distribution of bulk cement for western Michigan when the plant is completed.



Golden Gate International Exposition Island, in San Francisco Bay, as it will appear in 1939



"Treasure Island," site of the 1939 Golden Gate Exposition, is a 20,000,000-cu. yd. fill surrounded by a sea wall made from 287,000 tons of rock



Unloading cement at the mixer of the Clinton Construction Co. The conveyor handles sand and gravel unloaded at a wharf outside the picture

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of Aug. 14:

Trunk

36106. Sand (other than ground or pulverized or natural bonded molding), in open top cars without tarpaulin or other protective covering, C. L., from Pulaski, N. Y., to various points in New York state, rates ranging from 70 to \$3.20 per net ton, in lieu of present 6th class rates.

36122. Limestone, crude, fluxing, foundry and furnace, in open top cars, C. L. (see note 3), from Templeton, Penn., to Monessen, Penn., 94c per gross ton, in lieu of present sixth class rate of 15c per 100 lb.

36129. Crude limestone, in open top equipment, C. L. (see note 3), from Capon Road, Va., to Vandergrift, Penn., \$1.29 per gross ton, in lieu of present 6th class rate.

36141. Stone, crushed, slag and/or gravel, coated with oil, tar or asphaltum,* in open top cars, in straight or mixed C. L. (see note 3), from Dunbar, Penn., to Aberdeen, Md., \$1.89; Wilmington, Del., \$2.03 per net ton, in lieu of present class rates. Reason—Based on I. C. C. Docket 25028 scale, extended.

36162. Sand (other than ground or pulverized or naturally bonded molding) in open top cars, without tarpaulin or other protective covering, C. L. (see note 3), provided that orders will not be accepted for open top cars of less marked capacity than 80,000 lb., and provided further that when a shipper orders a car of above mentioned marked capacity, or greater, and the carrier is unable to furnish a car ordered and furnishes a car of greater capacity than ordered the min. wt. for the car furnished shall be that which would have obtained had the car ordered been furnished and used.

Sand (other than ground or pulverized) in closed cars or in open cars with tarpaulin or other protective covering; sand, naturally bonded molding, in open top or closed cars, C. L. (see note 3), provided that orders will not be accepted for closed or open top cars of less marked capacity than 60,000 and 80,000 lb., respectively, and provided further, that when a shipper orders a car of these marked capacities, or greater, and carrier is unable to furnish a car ordered and furnishes a car of greater capacity than ordered, the min. wt. for the car furnished shall be that which would have obtained had the car ordered been furnished and used. (Proposed rates in cents per 2,000 lb.) From Boswell, Penn.

To B. & O. R. R.	In open equipment	In closed equipment
Johnstown, Penn.....	80	110
Uniontown, Penn.....	90	130
P. R. R.		
Greensburg, Penn.....	120	140
Jeannette, Penn.....	120	140
Irwin, Penn.....	130	140
Trafford, Penn.....	130	150
E. Pittsburgh, Penn.....	130	150
Uniontown, Penn.....	110	130

36175. Sand, common or building (not industrial), C. L. (See Note 3), from Boonville, N. Y., to Painted Post, N. Y., \$1.70 per net ton, in lieu of present sixth class rate.

Sup. 1 to 36008. Sand (other than ground or pulverized), in closed cars, and sand, naturally bonded molding in open top or closed cars, C. L. (see Note 3), from Berkeley Springs-Hancock, W. Va., and Round Top, Md., to Montreal, Que., \$4.50 per net ton.

Central

51572. To establish on sand, except industrial, in open top cars, C. L. (see note 3), from Kenneth, Ind., to Winchester, Ind., rate of \$1 per net ton. Route: Via P. R. R. direct.

51573. To establish on crushed stone, crushed stone screenings, and crushed stone tailings, C. L., in open top cars, from Rimer, O., to Sherwood, O., 85c and to Mark Centre, O., 90c per net ton.

51587. (a) To amend C. F. A. L. Tariff 218-J, naming rates on lime, common, hydrated, quick or slaked, C. L., min. wt. 30,000 lb., from points in C. F. A. territory, to Norfolk, Va., and points taking same rates or arbitrators higher, by providing that rates on lime as published to Norfolk, Va., will not be subject to application of Agt. Jones' Basing Tariff 470-A, which will have the effect of cancelling present rates to points in Virginia. (b) to establish in lieu of rates to be canceled as per proposition (a) above, specific rates to base points and ends of branches, on basis of 110 per cent of the I. C. C. Docket 16170 scale, using class rate grouping, made subject to rule 27, and also subject to minimum charges. Below is illustration of proposed rates from and to representative points: From Gibsonburg, O., to Richmond, 495c; Lynchburg, 460c; Warrenton, Manassas, Calverton, 495c; Harrisonburg, 450c; Hot Springs, 430c; New Castle, 450c; St. Paul, Doran, Honaker and Norton, Va., 440c per net ton. (c) To amend C. F. A. L. Tariff 563, naming rates on lime, common, hydrated, quick or slaked, C. L., min. wt. 30,000 and 50,000 lb., from points in Indiana and Ohio to points in the south, by making tariff subject to proper minimum charges.

51602. To publish in the form of specific commodity rates, on silica, silice, siliceon and silicate, C. L., min. wt. 40,000 lb., from Elco, Murphysboro, Tamms, Cairo, Olive Branch, Ullin and Thebes, Ill., to Toronto, Ont., 29c; Montreal, Que., 45c; Windsor, Ont., 25c; Hamilton, Ont., 28c. From E. St. Louis, Ill., to Toronto, Ont., 28c; Montreal, Que., 44½c; Windsor, Ont., 24c; Hamilton, Ont., 27c.

51636. To establish on blocks and building tile, cinder cement (not reinforced), C. L., min. wt. 60,000 lb., subject to Rule 24 of Official Classification not to apply, from Cleveland, O., to Schenectady, N. Y., 22½c, and Fort Madison, Ia., 23c.

51614. To establish on stone, crushed, in open cars, C. L. (see note 3), from Kewau-naw, Manitowoc and Milwaukee, Wis., to Meadville, Pa., 260c per net ton. Note—Proportional rate applicable only on shipments originating west of Manitowoc or Milwaukee, Wis.

51645. To establish on glass sand, C. L., from Howard, Ohio, to Salem, Ohio, 115c in open cars and 133c per net ton in closed cars. Route: Via P. R. R.

51646. To establish on core sand, C. L., from the so-called Vassar Group, viz.: Vassar, Wampson, McHale and Juniata, Mich., to Meadville, Pa., 250c per net ton in open top cars and closed cars.

51658. To establish rates on limestone, unburnt, ground or pulverized, C. L., min. wt. 60,000 lb. (Rates in cents per net ton.)

To	From	
	Martin, Ohio	Marblehead, Ohio
	Proposed	Proposed
Detroit, Mich.	130	150
Bay City, Mich.	175	185
Ann Arbor, Mich.	125	140
Saginaw, Mich.	170	185
Port Huron, Mich.	160	175
Jackson, Mich.	140	150
Lansing, Mich.	160	170
Battle Creek, Mich.	160	170

Kalamazoo, Mich.	170	185
Grand Rapids, Mich.	185	195
Ludington, Mich.	225	235
Baldwin, Mich.	205	215
Reed City, Mich.	205	215
Clare, Mich.	195	195
Muskegon, Mich.	195	205
South Haven, Mich.	185	195
Benton Harbor, Mich.	185	195

51694. To establish on sand, industrial, C. L. (see note 3) from Sandusky, Ohio, Group, viz.: Amherst, Avery, Berlin Heights, Ceylon, Huron, Milan, Parkerstown, Shinlock, Smith Siding, Soldiers Home, Weyers and Wilmot to points in Ontario, Canada, as shown in Exhibit C attached, rates on basis of sand rates in effect prior to July 1, 1935, from Sandusky, Ohio, to Detroit, Mich., Port Huron, Mich., and Suspension Bridge, N. Y., plus the Canadian sand specifics as per Canadian Freight Association Division Sheet 7-A.

Exhibit C

Proposed through rates on sand from the Sandusky, Ohio, Group to destination points in Ontario; rates in cents per net ton:

Destination	Rate	Destination	Rate
Appin	309	Owen Sound ..	474
Belle River	274	Park Hills	334
Brantford	334	Petersburg	334
Brucefield	424	Petrolia	309
Chatham	309	Preston	334
Cornwall	524	Sandwich	234
Dundee	334	Sarnia	297
Dunnville	334	St. Catharines ..	334
Dutton	309	St. Marys	334
Elora	449	St. Thomas	309
Fargo	309	Seaforth	424
Fergus	449	Stratford	334
Galt	334	Tilbury	309
Geulph	334	Tillsonburg	334
Glencoe	309	Toronto	374
Goderich	449	Walkerton	474
Hamilton	334	Walkerville	234
Hespeler	334	Wallaceburg	309
Ingersoll	334	Welland	334
Kitchener	334	Windsor	234
LaSalette	334	Wingham	474
London	309	Woodstock	334
Lucan	334	Wyoming	309
Niagara Falls	287		

51714. To establish on limestone, ground or pulverized, unburned, in box cars, C. L., min. wt. 60,000 lb., from Sibley, Mich., to Buffalo, 205c; Cortland, 275c; Rochester, 235c; Schenectady, N. Y., Scranton, Penn., 315c; Syracuse, 265c; and Utica, N. Y., 285c per net ton.

51717. To establish on sand, naturally bonded molding, in all kinds of equipment, C. L.; sand (except naturally bonded molding, ground or pulverized sand) in closed equipment, C. L. (see note 3), but orders will not be accepted for closed and open cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively (see exception), from Patoka to Evansville, Ind. (when destined to points south of the Ohio River and east of the Mississippi River), 45c per net ton.

Exception—When a shipper orders a car of above mentioned marked capacity, or greater, and the carrier is unable to furnish a car ordered and furnishes a car of greater capacity than that ordered, the minimum weight for the car furnished will be that which would have obtained had the car ordered been furnished and used.

51747. To establish on stone (industrial), in bulk, in open-top cars, C. L. (see note 3), from Scioto, O., to Ashland, Ky., 84c; Canton, 92c; Cleveland, 105c; Hamilton, 113c; Jackson, 76c; Lorain, 105c; Massillon, 92c; Portsmouth, 84c; Steubenville, Warren, O., Weirton, W. Va., and Youngstown, O., 105c per gross ton.

51774. To establish on sand (except industrial) and gravel, in open top equipment, C. L. (see note 3), from Cleveland, O., to Solon, O., 50c per net ton.

51795. To establish on gypsum rock, crushed (not ground), or mine run, C. L., (See Note 3), but not less than 60,000 lbs., to Kosmosdale, Ky., from Grand Rapids, Mich., Gypsum, Port Clinton, O., 260c; Alabaster and National City, Mich., 310c per net ton.

51801. To cancel present rates on sand, refuse foundry, C. L., min. wt. 50,000 lb., from Berea to Linndale, and from Middletown, O., to Cincinnati and Lockland, O., published in C. C. C. & St. L. Ry. Tariff 525-Q, Item 1205, and other individual lines' tariffs. Classification basis to apply in lieu thereof.

51812. To cancel present scale of rates on lime, refuse (waste-product obtained in the manufacture of beet sugar), C. L., in open top cars, (See Note 2), from points in the lower peninsula of Michigan at which sugar factories are located to all points in the state of Michigan (lower peninsula), viz.: (a) For single line hauls—15 miles and under 55c net ton; 25 miles and over 15 miles 65c net ton; 35 miles and over 25 miles 70c net ton; 45 miles and over 35 miles 75c net ton; 55 miles and over 45 miles 80c net ton. (b) For two line hauls, 20c per net ton in excess of the rates provided herein for single line hauls. Classification basis to apply in lieu thereof.

Southern

1964. Crude or ground mica and mica schist, including scrap mica, C. L., min. wt. 40,000 lb., from Denver, Colo., and points shown in Item 950, S. P. F. F. C. Freight Tariff 1028-A, to Lake Charles, La., and Texas Gulf ports listed in Item 1, S. P. F. F. C. Freight Tariff 1028-A. Present description—None published in S. P. F. F. C. Freight Tariff 1028-A. Present and proposed rates as follows:

Domestic rates (class) to Houston, Texas: Present—5, 111; A, 133; B, 96. Proposed—A, 30½; B, 30½; C, ...

13813. This submittal, included in Docket 876, assigned for March 1, 1937, hearing amended to suggest on feldspar, C. L., to Niagara Falls, Ont., from Erwin, Tenn., 670c; Minpro, Spruce Pine and Toecane, N. C., 682c; Bowditch and Cane Branch, N. C., 706c net ton.

15177. Dry ground mica and dry ground mica schist, C. L., min 60,000 lb. Establish rates from Johnson City, Tenn., C. C. & O. Group 5 points and Black Mountain Ry. Groups 6 and 7, to Memphis, Tenn., same as in effect from Forest Park, Ill., to St. Matthews and Louisville, Ky., same as in effect from C. C. & O. and Black Mt. Ry. stations to Cincinnati, O.

15215. Stone, crushed, C. L. Establish 140c net ton from Buchanan, Va., to Blanche, N. C.

15310. Amend description governing the mileage rates on ground phosphate rock in A. C. L. Fla. Local Tariff I. C. C. B-2632, to provide that when the rates for distances of 68 miles and under are used as factors for joint hauls, the resulting net rates will in no case be less than one cent per ton per mile; also that for distances in excess of 68 miles the rates are not to be subject to the Freight Rule No. 19 deductions on joint hauls.

15241. Lime, fluxing, C. L., min. 70,000 lb. Establish 256c cwt., Knoxville, River Front and Extension and S. Knoxville Extension, Tenn., to Cincinnati, Ohio, and Newport, Ky.

15313. Provide for mixed C. L. rule in connection with rate 156c on limestone, ground or pulverized, C. L., min 60,000 lb., and 320c net ton on limestone poultry grits, C. L., min 50,000 lb., from Dugan, Ky., to Cincinnati, O., same as now published in Item 699-A, S. F. T. B. Tariff 172-D.

15329. Sand, molding, C. L. Establish rates from Camden, Lipe, Sawyers Mill and Hollow Rock, Tenn., to points in Wisconsin on a relative basis with rates in effect to points in Illinois. Rates will be furnished on request.

15344. Lime, common, hydrated, quick or slaked, C. L., min. 30,000 lb. Cancel, as obsolete, rate of 21 cents cwt. from Rutland, Vt., to Birmingham, Ala., and district points. Class or combination rates to apply.

15350. Agricultural limestone, ground or pulverized, in open-top cars, C. L. Establish rates from Mascot and Strawberry Plains, Tenn., to Sou. Ry. Memphis division stations, Corinth, Miss., to Memphis, Tenn., inclusive. Rates will be furnished on request.

15380. Fuller's earth, C. L., min. 70,000 lb. Establish to Toledo, Ohio, from Attapulgus, Ga., Jamieson, Midway and Quincy, Fla., 770c; from Superior, Fla., 820c net ton.

Western

C-151-9. Feldspar, crude or ground, C. L., from Custer, Hill City, Keystone, S. D., to Mississippi River crossings. Approved docketed proposal.

D-43-46. Rock, gypsum, C. L., min. various, from Medicine Lodge, Kan., to points in Colorado, Illinois, Iowa, Kansas, Nebraska, Missouri, Oklahoma. Proposed—Cancel the following rates from A. T. & S. F. Ry. Tariff 6681-F, viz.: Page 4, cancel all rates to Colo. Page 5, cancel all rates to Ill., except continue rates 14½c and 15½c per 100 lb., min. 60,000 lb., and 20½c per 100 lb., min. 30,000 lb., applying to E. Ft. Madison (proportional destined to points in Canada). Pages 6, 7 and 8, cancel rates to Ia., Kan., Mo., and Superior, Neb. Pages 10 and 11, cancel rates to Oklahoma, account obsolete or lower rates published elsewhere.

E-41-152. Sand from Briscoe, Fairview, Fegels Siding, Green River Road, Ind., to Council Bluffs, Ia. Approved docketed proposal.

E-43-45. Stone, rip rap, C. L. (see note 3).

To	From	
	LeGrand Limestone Company's Spur, located 2.22 miles from Quarry, Ia.	
	Present	*Proposed
Whiting, Ia.	\$.92	No change
Sloan, Ia.	1.33	\$.92
Salix, Ia.	1.37½	.92
Sergeant Bluff, Ia.	1.46½	.92
Wickham Spur, Ia.	1.53	.92
Sioux City, Ia.	1.53	.92

To	From	
	Louisville, Neb. Nehawka, Neb. Weeping Water, Neb.	
	Present	*Proposed
Whiting, Ia.	\$1.35	\$1.02
Sloan, Ia.	1.44	1.02
Salix, Ia.	1.48	1.02
Sergeant Bluff, Ia.	1.53	1.02
Wickham Spur, Ia.	1.60	1.02
Sioux City, Ia.	1.60	1.02

To	From	
	Gilmore City, Ia.	
	Present	*Proposed
Whiting, Ia.	\$1.428	\$.92
Sloan, Ia.	1.46	.92
Salix, Ia.	1.496	.92

*No switching to be absorbed at destination in connection with the proposed rates.

New England

42211. To cancel rate of 50c per net ton on sand, building, common or run of bank, in open top cars, C. L. (see note 3) but not less than 80,000 lb., from Rocky Hill, Conn., to Thompsonville, Conn., and apply in lieu thereof mileage commodity rate of \$1.10 per net ton as per N. Y. N. H. & H. R. R. I. C. C. F-3425. Reason—To cancel obsolete commodity rate.

42259. To eliminate routing via N. Y. N. H. & H. R. R., in connection with rates of \$3.40 and \$4.20, net ton, on common, hydrated, quick or slaked lime, published in Item 400B, and Item 1272 of B. & M. I. C. C. Nos. A2899 and A2900, respectively, from Rockland, Thomaston and Warren, Me., to N. Y. City, Brooklyn and N. Y. Ltge. deliveries, and stations in northern New Jersey named in Note I of B. & M. I. C. C. A2900, allowing class rates to apply. Reason—The N. Y. N. H. & H. desire route eliminated because of unsatisfactory earnings.

Southwestern

11803. To establish a rate of \$5.25 per ton of 2,000 lb. on crushed stone, C. L., from Wilds Spur, Colo., to Houston, Tex.

11860. To provide a uniform charge for reducing overloads on all lines as follows: "When a car containing sand, rock or gravel, loaded either on the rails of this car or received from connecting lines in road haul service at intermediate junction points, is found to be overloaded after it has left the shipping point or junction point with connecting line and before it has arrived at destination, the agent discovering the overload will remove the excess and sell it to the best advantage, notifying the shipper through the agent at point of origin of the action taken. Agent shall assess freight charges based on the carload rate on actual weight removed point of origin to point of removal plus the actual cost of removing the overload.

11861. Establish a rate of 18½c per 100 lb. on gypsum rock and gypsite, mine run or crushed (not ground), C. L. (see note 3), but not less than 60,000 lb., from Bucher, Okla., to Steelton, Minn.

11897. Crushed rock, Bromide, Okla., to Sherman, Tex. To establish rate of 70c per ton of 2,000 lb. on crushed rock, C. L. (see note 2), from Bromide, Okla., to Sherman, Tex.

11966. To transfer existing rates on gypsum rock, C. L., from Blue Rapids, Irving and Medicine Lodge, Kan., to cement mill points in S. W. F. B. and W. T. L. territories, from individual lines issues to W. T. L. Tariff No. 352-A and S. W. L. Tariff No. 31-A.

Proposed I. C. C. Reports

27469. Virginia Lime Products Co., Inc., vs. C. & O. et al. By Examiner Curtis. Recommends that the Commission find rate, chemical lime, Eagle Mountain, Va., to South Charleston, W. Va., unreasonable prior to April 3, 1936, to the extent it exceeded \$2.20 a net ton, minimum 50,000 lb., but reasonable thereafter. The complaint alleged that the rate charged on 655 carloads of chemical lime shipped between April 11, 1934, and April 3, 1936, was unreasonable and the rates thereafter were also unreasonable. The rate assailed was \$3.02, minimum 30,000 lb. The rate was reduced to \$2.20, minimum 50,000 lb., and \$2.80, minimum 30,000 lb., effective April 3, 1936.

Freight Rates

BURLINGTON RAILROAD has asked the Nebraska railway commission to fix cement freight rates at 11 cents between Superior, Neb. and Aurora, Neb. and 11½ cents between Louisville, Neb. and Aurora, Neb. to meet competition.

Gets Big Cement Order

TRINITY PORTLAND CEMENT Co., Fort Worth, Texas plant, has the contract to furnish 175,000 bbl. of cement at \$1.99 per bbl. for use in construction of the Marshall Ford dam near Austin, Texas. This is said to be the largest single contract ever received by the company. Republic Portland Cement Co., San Antonio, Texas, received a contract to supply 75,000 bbl. of cement for the same project at \$1.95 per bbl.

A Mineralogic Study of Silicosis

(Abstract by A. J. R. CURTIS, Portland Cement Corporation)

THOSE who are concerned with silicosis problems will be greatly interested in a recent study by Prof. R. C. Emmons and Ray Wilcox, University of Wisconsin geologists, and reported in the *American Mineralogist* for April, under the head "A Mineralogic Study of Silicosis".

The authors have made a study of the mineralogic and petrographic materials and technique in order to develop experimental backing for a suggested method of preventing silicosis. In doing so, they have adopted the theory that silicosis is due to the slow dissolving in the mildly alkaline lung fluid of particles in the nature of quartz. The silica thus liberated is either in true solution or in a colloidal suspension. It is dispersed radially outward from the mineral particle, collects on the walls of nearby cells and destroys their function so that the cells die. The connective tissue which replaces the dead cell tissue constitutes the silicotic nodule. Since the immediately noxious substance is the dispersed colloidal silica, any mineral which will liberate silicic acid when attacked by alkaline lung fluids is capable of causing silicosis.

Pure silica particles all carrying the same charge are mutually repellent. Phagocytosis of these particles is difficult because a silica particle being carried from the lung by a phagocyte will repel other silica particles, thus reducing the carrying capacity of the phagocyte.

Previous investigators have discovered that certain dusts apparently act as protectors against silicosis when inhaled with silica dust. The reason for this protective influence of certain dusts has not been entirely clear. The authors believe that the explanation lies in the fact that particles of the protector dusts in solution are oppositely charged to those of the colloidal silica and, therefore, attract the silica particles. These mixed minerals of positive and negative charges form flocculated aggregates; that is, particles in a state of close packing. Many more of these can be handled by one phagocyte since a given volume contains more particles. Furthermore, the colloidal silica is robbed of its potency while flocculated. Since a protector dust is a scavenger of colloidal silica, it will probably yield some benefits even when not inhaled along with the noxious dust. Maximum benefit is obtained, however, only when both dusts are inhaled simultaneously.

The most efficient protector dusts are lamp black (carbon), hematite (iron oxide), and the calcites (calcium carbonates). Calcareous shales are also protectors.

Solubility of Silicates

Experiments were formulated by the authors to determine the amount of free silica liberated from silicates when the silicates are attacked by alkaline lung fluids. Great care was taken to secure absolutely pure minerals. These minerals were immersed for two months in blood serum. Only particles in a size range from one to 15 or in some cases to 20 microns were used. Some of the minerals were tested with both human and beef blood serum while others were tested only in beef blood serum. At the end of the two months, every one of the minerals showed that some SiO_2 had been dissolved. Quartz was tested in the same manner as a control. Sericite, asbestos, biotite, and talc lost more SiO_2 than did the quartz. Sericite lost more SiO_2 than any other mineral, almost twice as much as quartz.

Since sericite has already been shown to be harmless, the investigators have concluded that the aluminum hydroxide set free simultaneously with the SiO_2 is oppositely charged and thus renders the SiO_2 harmless in the same manner as protector dusts would do.

The authors advocate in conclusion that protector minerals in the finer sizes (less than 10 microns) be added to render noxious dust harmless. Careful microscopic examination of the dust in question to learn size distribution and mineral content will dictate the kind and amount of protector dust that should be added.

Dust Control

THE DUST CONTROL EQUIPMENT ASSOCIATION at its meeting in Cleveland, Ohio, early in June gave careful attention to reports from the engineering committee of the association dealing with work in establishing standards of dust control practice, the need for which has existed for quite some time.

The association endorsed the recommendations of the engineering committee with regard to the adoption of a friction chart and the development of a formula for use in connection with that chart.

During the meeting the association was addressed by Theo. Hatch, associate dust control engineer, division of industrial hygiene, Department of Labor,

State of New York, on the subject "Importance of Modern Standards and Methods of Dust Analysis upon Design and Efficiency of Dust Control Equipment."

Standards of Dust Control Practice are rapidly nearing completion by the engineering committee of the association, according to announcement by Arthur J. Tuscany, executive secretary, whose offices are located in the Penton Building, Cleveland, Ohio.

At a number of meetings of the committee agreement has been reached on many questions which previously have been in doubt, thus clarifying relationship not only between purchaser and seller but between interests concerned with the dust hazard question.

The association has arranged for representation of its engineering committee on the American Foundrymen's Association safety and hygiene committee and the Air Hygiene Foundation, and request has been made for representation on the American Standards Association Committee Z-9, which committee is giving attention to the development of fundamentals relating to the design of exhaust systems.

Mr. Tuscany directs attention to the fact that neither the Dust Control Equipment Association nor its engineering committee proposes to prepare codes, but it is further pointed out that the services, advice or assistance of the committee is available to any group which is interested in going into the dust control question.

Dust Laboratory

VERMONT STATE DEPARTMENT OF HEALTH has announced the establishment at the Barre City Hospital, Barre, of a laboratory to make dust counts on dust samples taken from granite works, and to test dust collecting and protective devices. The laboratory will be in charge of Edward C. J. Urban, who is an air conditioning engineer and has recently completed a year's work on the study of dust removal at the Harvard School of Public Health. Another room will be used for the examination of stone workers, including X-rays of the chest, and for a careful medical and statistical study of the granite industry. Dr. Lester E. Judd is in charge of this department.

Silicosis Conference Reports

UNITED STATES DEPARTMENT OF LABOR has made available in booklet form summary reports submitted by the National Silicosis Conference Committees, February 3, 1937. There are 56 pp. The booklet is Bulletin No. 13 of the Division of Labor Standards and sells for 10c. It is probably the best and most authoritative summary of all angles of the silicosis problem at present available.

Switch Disconnected under Load



Results in Fatal Blast

MANY FATAL AND DISABLING ACCIDENTS have occurred in industry as a result of thoughtless handling of live electrical equipment, especially under circumstances where someone acted contrary to instructions. Such an accident recently took place in a cement mill with fatal results. The story of the accident is well worth reading as a possible means of heading off others of the same kind.

Early in the morning, in the plant where this accident occurred, it became necessary to start up a belt-driven d.-c. generator. The generator had been operating about an hour when it was noticed that the d.-c. lights were flickering. Upon investigation it was found that the belt was slipping to some extent.

The employee who located the trouble released some of the load on the gen-

erator and went to the tool room for a wrench with which to tighten the belt. During this lapse of time the d.-c. voltage dropped on a synchronous motor direct-connected to an air compressor, causing the motor to lose the excitation. Then the small switch and fuses on the synchronous motor switchboard failed.

At this point the motor stalled and the oiler, acting contrary to instructions, ran to the basement of the power house where the switch was located. He placed a step ladder before the switch and obtaining a wooden-handled switch-pole (used ordinarily to pull disconnect switches when not under load) he pulled the switch. This incident occurred at about 9 a.m.

It will be understood that the victim pulled the disconnect switch for a 440-volt, 3-phase, 60-cycle, 150-hp. syn-

chronous motor under load, a proceeding so dangerous that it is hard to imagine how it could be attempted by any man with even modest electrical operating experience. The arc short-circuited the contacts and the switch exploded spraying the victim with molten copper on the face, arms and chest, resulting fatally on the following day. Although the motor had stalled due to loss of excitation, the magnetic switch had not had time to release from overload.

The employee who lost his life in this unfortunate and entirely unnecessary accident had always been considered a careful and thoughtful worker. It is highly probable that in his anxiety and desire to avoid loss of power throughout the plant, he pulled the switch before considering the possible or in this case, the probable consequences.

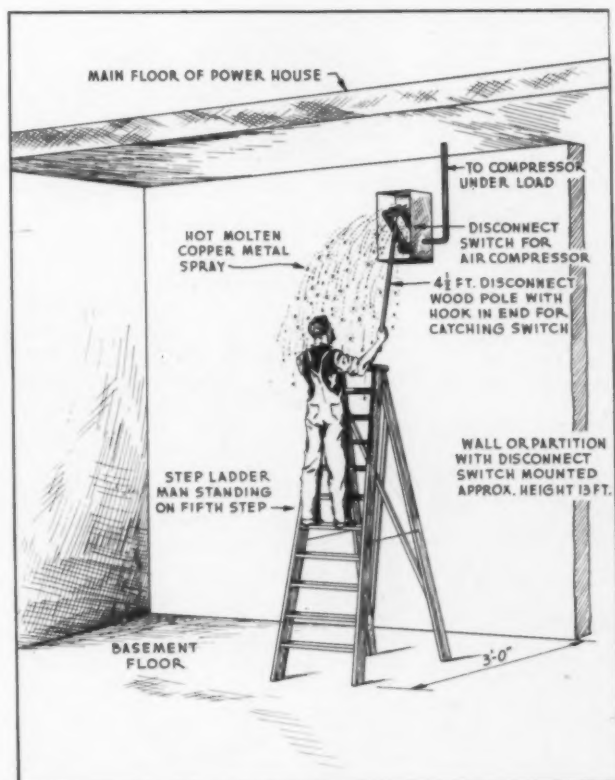
So momentary thoughtlessness in handling electrical equipment cost this man his life (he was but 34 years of age) after intense suffering; left his wife a widow and deprived the industry of a worker with eleven years' experience. What can we learn from this accident?

Lesson

Perhaps the most obvious rule that applies is never to disregard an instruction in the excitement of an emergency involving the operation of electrical equipment. Rely upon emergency protective devices such as circuit-breakers and fuses. In all plants such as those connected with the cement and rock products industries, authority to operate electrical switches and other control apparatus should be limited to an indispensable minimum number of persons and these frequently instructed and reminded regarding the emergency handling of equipment.

Pushing Production

Excavation of sand and gravel from the Ohio river for use in construction of the Tygart river reservoir in W. Va. is being pushed. It is expected that the contract will be completed about October 1.



Sketch illustrating how a cement mill worker met his death by acting contrary to instructions in an emergency. Too much emphasis cannot be placed on the dangers involved in the operation of electrical equipment and controls, and the authority to handle such devices even in event of an emergency should be invested in a few competent and properly-trained employees

New

MACHINERY & EQUIPMENT

Low Cost Welder

WESTINGHOUSE ELECTRIC AND MANUFACTURING Co., East Pittsburgh, Penn., announces the "Midget Marvel A-C Welder," designed to meet the need for a low cost welder for use in maintenance and repair as well as light construction work. This welder comprises a special transformer and control especially designed for alternating current arc welding. The new set is said to have an 87% average operating efficiency at normal loads. The 60-cycle model complete with accessories is listed at \$123.50



Low cost welder

and the 50-cycle model may be purchased for \$134.50.

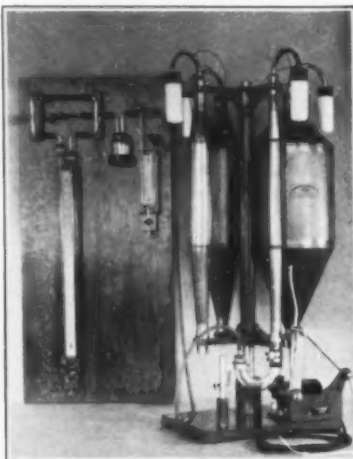
This welder is especially designed to pay dividends even though the hours of use may be limited. The current range of the sets are from 30 to 140 amperes with 12 steps of current adjustment, and the design is for use with coated electrodes of from 1/16- to 5/32-in. diameters. It is easily portable being equipped with four handles and four large hard rubber swivel casters for readily moving to convenient locations. Accessories include the welding lead with holder and current adjustment plug attached, the ground lead with clamp, a helmet, wire brush and a supply of electrodes and primary lead.

Particle Size Analyzer

AMERICAN INSTRUMENT CO., INC., Silver Spring, Md., has announced the "Roller Particle Size Analyzer," a device which is claimed to successfully analyze particle size distribution of fine, dry powdered materials. Any number of size fractions may be obtained with this analyzer, with size limits as close as desired, the smallest fraction conveniently secured being from zero to five or zero to three microns, depending on the density of the material. It is claimed

that percentage weight of different fractions is duplicable to 0.5%.

This analyzer is applicable to most dry powdered materials finer than approximately 200 mesh, and of size greater than colloidal. Among the ma-



Roller particle size analyzer

terials successfully analyzed by the instrument are cement, gypsum, magnetite, flint, feldspar, diatomite, metal powders, salt, talc, mica, carbon, pigments, mineral filters, etc. A complete technical discussion of its application and use is contained in the company's bulletin No. 2055.

Variable Speed Motor Pulley

REEVES PULLEY Co., Columbus, Ind., manufacturer of variable speed control equipment, has developed a new and improved countershaft type variable speed motor pulley. This "Vari-Speed Motor Pulley" is a compact variable speed unit which is mounted on the standard shaft extension of any con-



Variable speed motor pulley

stant speed motor and forms direct drive from the motor to the driven machine. Through handwheel control, a sliding base on which the motor and unit are mounted is moved backward or forward varying the diameter of a set of adjustable discs from which a V-belt runs to the driven machine. Desired speed changes are made as the belt runs from maximum to minimum disc diameters.

For unusual requirements in speed variation, a countershaft is mounted on a common base with the rest of the unit. In the design illustrated, the pulley may be mounted in the center of the countershaft, between the two bearing housings, to provide a compact, space-saving unit in installations where this factor is important. The new pulley is built in seven sizes, transmitting from fractional to 7½ hp. and covering speed ratios of 3:1.

Wagon Scraper

CONTINENTAL ROLL AND STEEL FOUNDRY Co., Tractor Equipment Division, East Chicago, Ind., announces the



Rugged Scraper

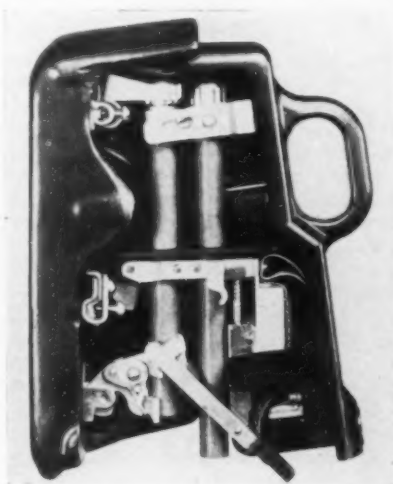
"Junior Continental," a new 4-yd. wagon scraper designed for use with 35- to 50-hp. crawler tractors. The manufacturer claims that this scraper is light in weight without sacrificing the ruggedness required in excavating and loading tough clay, rock, shale, hardpan, etc.

First-Aid Kit

DAVIS EMERGENCY EQUIPMENT Co., New York, N. Y., announces a new type first-aid kit, the "Brac-Kit," designed especially for industrial use. A special feature of this kit is that the first-aid supplies are firmly locked with a dust-proof, water-proof seal. The outer case may be permanently mounted in any convenient location. With a twist of the wrist, the kit is unlocked and withdrawn and its contents are available for instant use.

Fuse Cutout

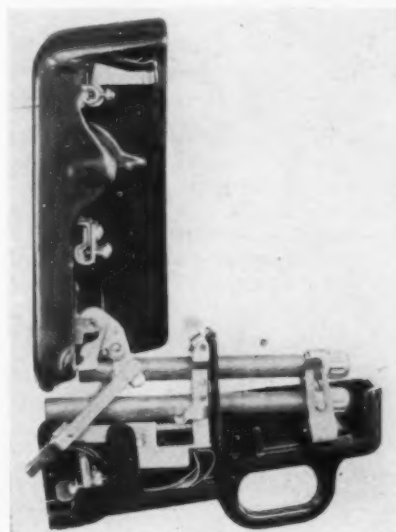
GENERAL ELECTRIC Co., Schenectady, N. Y., has placed on the market a new porcelain-housed fuse cutout featuring a reclosing mechanism entirely in the door, which is interchangeable with the door of present G.E. 50-amp. indicating and drop-out cutouts. The reclosing door of the new unit contains two fuse holders. Should the first fuse link blow, the door is pushed outward at the bottom, and after a time delay of one second the other fuse holder with its



Cutout in indicating position

link is connected, thus restoring service if the fault is temporary. If the second fuse blows, the complete door drops open and is isolated from the circuit.

The time delay to permit the temporary fault to clear itself before the



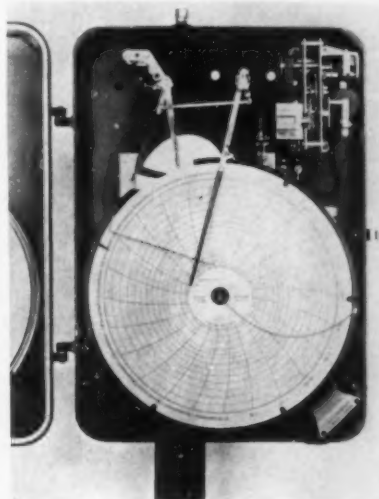
Cutout in drop-out position

second fuse holder with its link is connected is controlled by a completely housed timing mechanism of the es-

capement type with free-running gears and is designed to operate under most severe conditions and over a wide range of temperatures.

Electric Integrator

THE BRISTOL Co., Waterbury, Conn., has developed a new electric integrator for totalizing the flow of gases or liquids once every 15 seconds and now furnishes its mechanical and electric flow meters

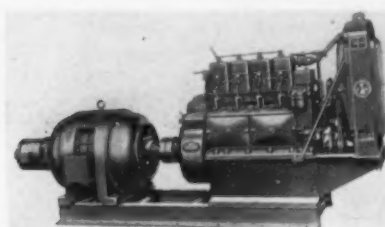


Flow meter integrator

equipped with the integrator. The flat disc cam partially shown in the illustration is designed to coincide with the flow law so that it mechanically computes the square root of the differential pressure across an orifice plate or venturi tube constriction in a pipe line at 15 second intervals. The values obtained are totalized by means of a counter and are indicated on an integrator dial. The integrating mechanism consists essentially of a continuously running telechron motor which operates a counter through a train of gears, which are engaged and disengaged by means of a mercury switch and magnet.

Diesel Generating Sets

FAIRBANKS, MORSE AND Co., Chicago, Ill., has published bulletin 3600-A2 describing and illustrating the construc-

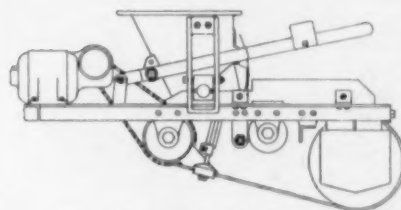


Compact Diesel-generator set

tion and application of the model 36-A Diesel generating sets. These sets are applicable for use as independent units in industrial plants to carry the entire load or for parallel or auxiliary operation in conjunction with other electrical service. The compact design makes these sets desirable for service on machines requiring individual power plants, such as electrically operated shovels and dredges and for use as portable and semi-portable electric power plants. Alternating current sets are offered in ratings from 5.3 to 100 kv.a. and direct current sets from 5 to 80 kw.

Improved Feeder

HARDINGE Co., York, Penn., announces an added feature to its constant weight feeder, developed to incorporate in the feeder a single unit to achieve two objectives. The feeder is now equipped with a standard magnetic pulley to remove tramp iron and steel from materials to be fed from a bin to such machinery units as grinding mills, dryers, mixers and kilns while feeding



Two-purpose feeder

and weighing them prior to processing. The new feature was added to eliminate installation of separate magnetic pulleys beyond the feeder. The unit illustrated is obtainable for capacities ranging from a few pounds per hour up to 200 tons an hour, and for feeding fine materials as well as lumps up to four or five inches in size. Wiring to the motor is separate from that to the magnetic pulley, the pulley operating on direct current from a separately excited direct current generator, or local direct current if available.

Welded 2½-Yd. Shovel

HARNISCHFEGER CORP., Milwaukee, Wis., has added P & H model 955 to its newly redesigned line. Like the 2-yd. shovel described in *Rock Products*, July, 1937, p. 80, it is of arc-welded construction, permitting much reduction in weight over older models of the same capacity. Roller bearings are used wherever possible, it is said. The standard shovel is powered by an 8-cylinder 185-hp. Fairbanks-Morse Diesel engine. It is convertible into a dragline and can be changed to longer crawler treads if necessary.

Digest of Foreign Literature

By F. O. ANDEREGG,

Consulting Specialist in Building Materials, Newark, Ohio

Hydraulic Admixtures and the Action of Aggressive Solutions on Concrete—Two thoughts are expressed concerning the effectiveness of pozzuolanic admixtures in increasing the resistance of concrete against aggressive waters. The viewpoint most widely held is that the admixtures added are supposed to react with the lime set free to form resistant hydrosilicate or hydroaluminates. Holders of the other viewpoint feel that the amount of active admixture, even judging by its ability to combine with lime under the most favorable conditions, is insufficient as usually added to have appreciable beneficial effect in this way, but that the increased density obtained, by reducing the opportunity for aggressive solutions to penetrate through the concrete, is a better explanation. Exponents of the latter conception point out that the addition of ground quartz of the same size distribution, even though the quartz reacts with lime at ordinary temperatures at an extremely low rate, seems to have just as good an effect as the addition of many of the so-called actively pozzuolanic admixtures. These questions have been engaging the attention of A. Steopoe of Bucharest for several years and some of his contributions have from time to time been reviewed in these columns.

He points out that several reactions or effects are probably concerned in the phenomena under consideration. In the first place, many of the admixtures have some zeolitic character so that a base exchange reaction takes place:



Evidence of such action has been obtained with Rumanian trass and with tuffa sands, the calcium compound so formed having some cementing power. In the second place, lime reacts directly with the silica, alumina and perhaps ferric oxide compounds to form calcium hydro-salts, but since this action depends upon the lime content present, it proceeds farther in calcium hydroxide than in portland cement mixtures. The course of the reaction between lime and trass, etc. may be followed by determining the increase in silica soluble in hydrochloric acid. And yet S. feels that these two reactions do not cover the chief role of trass as admixture to cement. He points out that the products of hydration of portland cement are hydrosalts which are in equilibrium with calcium hydroxide solutions: $\text{CaO} \cdot \text{SiO}_2$ aq. . . . 0.131 g. $\text{CaO}/\text{l.}$, $\text{CaO} \cdot \text{Al}_2\text{O}_3$ aq. . . . 0.360 g. $\text{CaO}/\text{l.}$, and Calcium hydroferite . . . 0.640 g. $\text{CaO}/\text{Cal.}$ Below these

lime concentrations hydrolysis sets in. In addition in the presence of aggressive solutions other reactions occur; not only is the solubility of the lime often enhanced but metathesis reactions tend to remove more lime. The trass-lime compounds also suffer from such attack, as it is known they are broken down by pure water, to say nothing of active salts, which may be expected to take the lime out of the trass compound faster than from the true cement compounds. Therefore, it is to be expected that aggressive solutions remove more lime from trass cements than from straight cements.

When attempts are made to determine the lime set free from hydrated cements, with the aid of glycol, glycerol or phenol, the results are unreliable because of the effect of the water, which is always present, in continuing the hydration and hydrolysis of the unhydrated cement compounds under the conditions used in the analysis. Therefore, arguments based on such analytical data are not properly based and must be disregarded. We must look elsewhere for an explanation of the beneficial action of the presence of pozzuolanic materials against aggressive solutions. The explanation seems to lie in a suggestion of Ferrari of the formation of a protective layer of silicic acid and of the sesquioxides formed when the lime is actually removed from the lime-trass compounds! Therefore, the action of the admixture is the formation of lime compounds, which are readily attacked to leave a protective layer, chiefly of silicic acid. This explanation is in agreement with the observations made by Rebuffat and Severi on the action of sea water on new and old concrete, and with the explanation of Guttman for the hardening action of the atmosphere on blast furnace slag cements. *Zement* (1937) 26, No. 11, p. 169.

• • •
The Resistance of Portland Cement in Magnesium Sulfate Solution—It is frequently remarked that the point of attack of magnesium and other sulfate solutions upon concrete lies in the presence of lime set free from the hydration of tricalcium silicate. G. Haegermann, director of the German Portland Cement Association Laboratory, points out the following previously published exceptions: Graf and Walz have studied about 100 different cements and have come to the conclusion that the brand of the cement and not the kind was to be correlated with the resistance to

such attack (in agreement with the recent conclusion of Prof. Miller of the University of Minnesota). Both Bogue and Thorwaldson have shown that the compound, tricalcium silicate, is quite resistant to sulfate solutions. H. has made additional experiments which he thinks have bearing upon the differences between various brands of cements. He points out that relatively small changes in composition often make great differences in resistance to aggressive attack. The fineness of grinding has an effect and the degree of burning is very important.

In the first series H. started with the raw mix of a plant using chalk limestone and burned it at two temperatures, 1450 and 1350 deg. C., for half an hour. He also enriched the raw mix by adding SiO_2 as quartz, CaCO_3 , Fe_2O_3 , MgO or Al_2O_3 (with the limestone necessary for the last). These were all burned for 30 minutes at the high temperature. The cements were ground so that about 61% was below 30 microns. Prisms 4x4x16 cm. were made 1:2:0.6 with standard sand and water. After 24 hours in damp air and 6 days under water they were stood half covered in 10% magnesium sulfate solution for two years, after which the upper and lower halves were crushed and compared with the 28-day wet and combined storage, standard compressive strengths. The only one of this series which compared favorably with the standard was the harder burned regular mix. All additions to the regular mix were harmful. This mix contained 8% C_3A , while the others contained 12 or more.

In the second series a wet mix of chalk and septarien clay was used as base and varying amounts of alumina or iron oxide were added to vary the ratio of C_3A to C_4AF in the finished clinker. As soon as the former exceeded the latter, the resistance decreased steadily. In the third series a shell limestone and clay raw mix was used with SiO_2 about 2% below Series B. The results obtained here were the same. From these results the following conclusions have been drawn: Al_2O_3 and Fe_2O_3 together should lie between 7 and 10%. Their ratio should approximate unity. $\text{CaO} \cdot \text{SiO}_2$, referring to the lime in combination with the silica, should lie between 2.3 and 2.6. Magnesia should be present in small amounts only. Use gypsum as required. The lime available for the silica is best calculated according to Lea and Parker,—

$\text{CaO available} = \text{CaO total} -$

$$(1.18 \times \text{Al}_2\text{O}_3 + 0.65\text{Fe}_2\text{O}_3)$$

A very desirable analysis for a good resisting cement is suggested: S.23; A.5; F.4; C.66; MgO and alkali, 2; giving a ratio of available lime to silica of 2.5. *Zement* (1937) 26, No. 14, p. 210.

Concrete Products

Cement Products

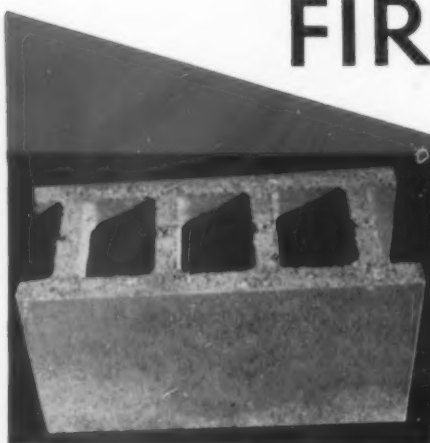
TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

The Sculptor's Art in Cement and Sand



Fritz Henkels, German born resident of Santa Monica, Calif., has never studied sculpturing or art yet has achieved remarkable results with cement, beach sand and a few tools. Among his first creations are those illustrated above, of Will Rogers, Theodore Roosevelt, General Von Hindenburg and Abraham Lincoln

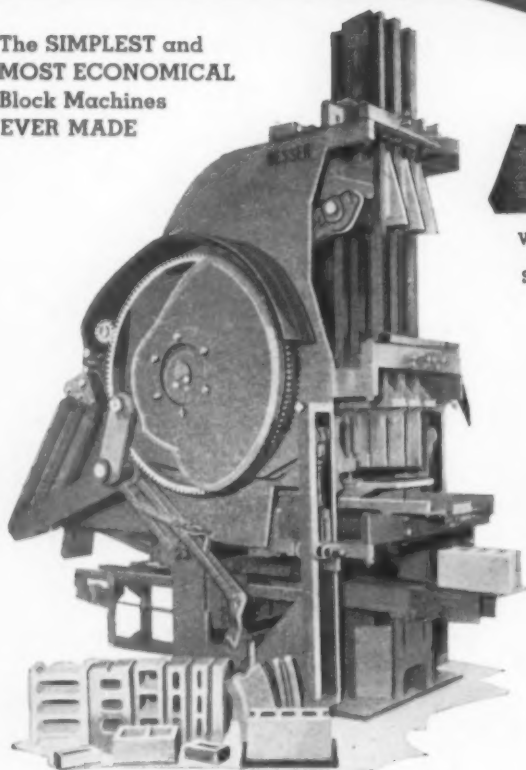
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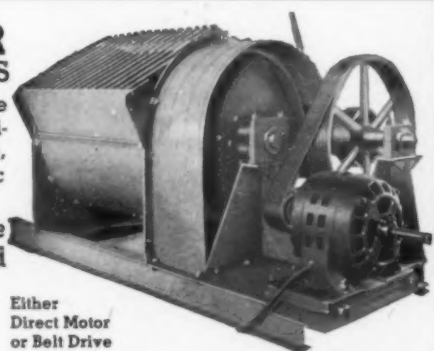
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NATIONAL CINDER CONCRETE PRODUCTS ASSOCIATION CONSIDERS

Plant Operation and Merchandising

AT MEETING IN ATLANTIC CITY

WITHOUT A DOUBT the meeting of the National Cinder Concrete Products Association held in Atlantic City, August 2, 3 and 4 was the most constructive in the life of that organization. Attendance totaled about 70 which included representatives of 40 cinder products manufacturers, four masonry manufacturers and others interested in the cinder block business. Those in attendance frankly admitted that serious problems confronted the industry but they were sincere in their determination to overcome these problems and build an even bigger and better industry.

No business was transacted the first morning of the convention; it being devoted wholly to registration, visiting and a general get-together. On Monday afternoon a discussion was held concerning manufacturing methods, with representatives of several machinery manufacturers discussing the latest developments in their equipment for making cinder block. Vast strides have been made in this respect during the depression years and the years following and not only are the block machines themselves speeded up and improved but mixers and equipment for

crushing and grading are also vastly superior to what they were three years ago, according to the equipment manufacturers.

High Pressure Steam Curing

The morning session on Tuesday was an important one devoted principally to the subject of quality. The necessity of producing quality units was, those in attendance felt, the important subject confronting them. Paul Woodworth of the Portland Cement Association and Ed Prettyman of Grays Ferry Brick Co., Philadelphia, Penn., both discussed high pressure steam curing, Mr. Woodworth telling of his observations at various plants and Mr. Prettyman relating his experience in his own plant over a period of years. Considerable discussion resulted after these two talks and many questions regarding results, cost of installation and operation were asked of the speakers. It was evident that the subject of high pressure steam curing is of more than ordinary interest to cinder block men.

Electric Curing

Electric curing of concrete masonry

was presented in a paper by a Detroit manufacturer of concrete products, in which he gave the background of the process and described its applications and discussed costs of operation.

For the benefit of those who might not be familiar with the "electro-cure" process of curing concrete, which is being introduced in the United States by the Technical Development Corp., Detroit, he discussed the theory involved in its use and its advantages.

Results of tests of the process as applied on various types of precast units, using widely different aggregates and mixes, were treated. The results were fundamentally the same for all cases and it was found that after six hours of curing by electricity, units could be easily handled and high compressive strengths were obtainable in a matter of hours. The type of curing racks and the electrical units to be used were described. In conclusion, it was stated that the cost of electric curing is about 3/10 of a cent per block based on a two cent kilowatt-hour rate.

Securing an adequate supply of the right kind of cinders is a subject that concerns every cinder block manufac-



Group of cinder block manufacturers and others in attendance at the National Cinder Concrete Products Association Meeting



Ed Prettyman, Philadelphia, Penn.; Gene Olsen, Adrian, Mich.; Fred Reinhold, Buffalo, N. Y.; Frank Muenzer, Elmore, Ohio; John Muenzer; and Herb Davis, Arlington, Va. (left to right) out for a stroll between business sessions

turer and much time was devoted to a discussion of where and how to secure this supply and how cinders should be treated after they have been secured.

Storage of Units

During this session low pressure steam curing was not neglected. Various layouts and methods were discussed. Most manufacturers seemed to feel that block should be yarded in yards having covered storage. It seemed to be the consensus of opinion that such storage was essential for the production of a quality product and discussions after the session indicated a considerable number of manufacturers proposed to erect this type of storage during the next few months.

Tuesday afternoon's session was opened with a paper on high early strength cement for cinder block by D. S. MacBride of the Lone Star Cement Corp., New York, N. Y. Mr. MacBride's paper was a fair, open-minded discussion showing the advantages of this type of cement. The discussion that followed was especially interesting and the other side of the cement picture; that is, the use of regular cement, was ably handled by J. H. Chubb of the Pennsylvania-Dixie Cement Corp., New York, N. Y. The consensus of opinion seemed to be that this discussion had given everyone present a much clearer understanding of the cement problem than they had had before.

Merchandising

Paul Woodworth again appeared on the program with a discussion of the selling advantages of cinder block. He quoted extensively from the manual issued by the National Concrete Masonry Association, "Facts About Concrete Ma-

sonry," showing that cinder block manufacturers had in every respect excellent arguments for the sale of their material against such competition as hollow tile clay block.

The Wednesday morning session was a closed business session for cinder block manufacturers only. Problems relating only to the industry were discussed as were numerous inter-industry merchandising and selling situations.

A committee consisting of several of the cinder block manufacturers and representatives of some of the cement companies was appointed to make a further study of the problem of securing a better quality cinder unit. In addition to the technical research and investigation, this committee is to try and develop a name other than "cinder block" for their material—something descriptive and yet with sales appeal. This committee was also empowered to study existing specifications for cinder block and to make recommendations that will enable manufacturers to make block in compliance with these specifications so that they will assure the building trade of a definite quality standard that can be relied upon.

The balance of Wednesday's sessions were largely given over to officials of the Federal Housing Administration who not only voiced their approval of cinder units for house construction by giving the material their whole-hearted approval but also advanced sales, merchandising and advertising suggestions with which those present could capitalize on the tremendous market ahead.

Officers of the association were re-elected for the coming year. Roy McCandless, Cinder Block, Inc., Detroit, Mich., is president and Harry Longenecker, Philadelphia, Penn., secretary-treasurer.

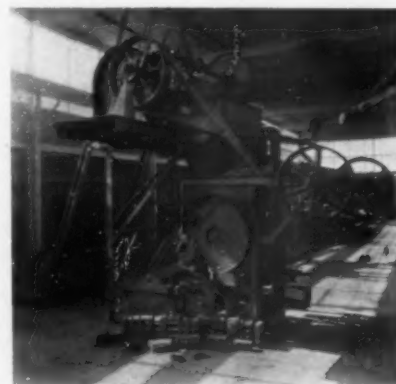
Concrete Groups Again Select Chicago

THE EIGHTEENTH annual convention of the National Concrete Masonry Association is to be held at the Sherman Hotel, Chicago, Ill., February 8-11, 1938 for the second year in succession. The Board of Directors of the association decided on Chicago again because of the tremendous success of the last convention when the largest group of manufacturers of concrete products in the history of the association was in attendance. An extra day has been allotted to provide more time for meetings of the smaller groups to discuss the manufacture of precast concrete joists and other special products. The machinery exhibit will be again held under the same roof as the sessions of the convention.

The Cast Stone Institute will also be one of the concrete industries groups to take part in Chicago's second successive "concrete week." The meeting place of this convention will be chosen so that delegates may conveniently participate in the Concrete Industries Exposition and the program will likely cover newer methods in manufacturing methods and round-table discussions on problems of interest to the industry.

Concrete Masonry Houses for South America

EIGHT HUNDRED small workmen's houses are to be built by the South American government in Puerto Cabello, Venezuela, within the next six months. Concrete masonry units will be used for all outside construction. The government has awarded a contract to a construction company in Caracas for the entire job. A Besser Super Automatic Plain Pallet Stripper is being installed in Puerto Cabello to make the units. It is expected that other similar housing operations will be undertaken by the government in other locations in Venezuela.



Unitized block manufacturing equipment to make units for Venezuelan housing project

STEARNS POWER STRIPPER

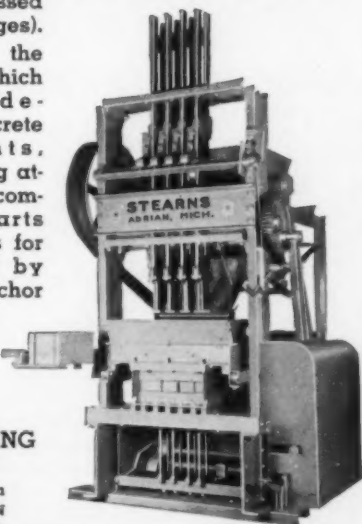
The leader of a complete line of machines made by this substantial, dependable company. No other machine makes as many blocks per man. Thin web, light weight blocks with tops that are entirely pressed (no core bar ridges).

We also make the Stearns Mixer which is particularly designed for Concrete Products Plants, Straub oscillating attachments and complete repair parts and attachments for machines built by the former Anchor Company.

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MANUFACTURING
COMPANY**

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THE ADVANTAGES OF CORED PALLETS

**Better Blocks
More Economical Curing
Less Block Breakage
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Lower Machine Investment**

"Commercial" Steel Pallets
support the above statements
They are made in many
different styles and sizes

Write for catalog

The Commercial Shearing & Stamping Co.
YOUNGSTOWN, OHIO

LOW INITIAL COST LOW MAINTENANCE COST



**CHASE
EASY
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Save money on your production costs by installing Chase Lift Truck Rack or Concrete Cars with Chase Patented Spring bearings—dust proof, oil retaining flexible boxings with roller bearings. Used and recommended in most of the concrete plants.

WRITE
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Special Low Prices

Complete line of concrete block cars, decks, Lift Truck Racks, transfer cars, turntables, dump cars, etc.

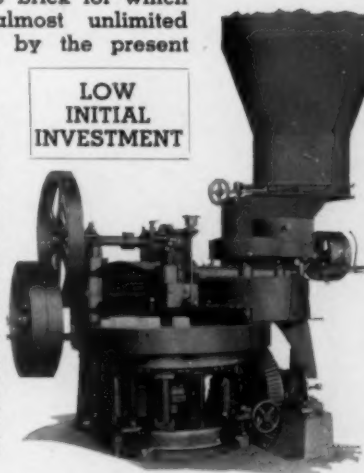
**CHASE DRYER CARS &
TRANSFER CARS**
CHASE FOUNDRY & MFG. CO. COLUMBUS, OHIO

..... HOW TO BUILD A PROFITABLE BUSINESS

Make sand lime brick for which there is an almost unlimited market created by the present building boom.

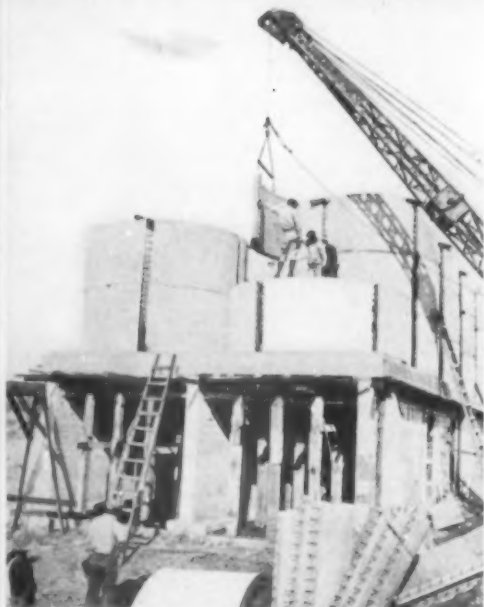
**LOW
INITIAL
INVESTMENT**

This Press and Material Hopper combines all the most modern improvements resulting from many years of building and developing machinery for making high-grade, attractive sand lime brick. All parts are sturdily built, easily maintained and necessary replacements quickly made. These features mean maximum production, low operating cost and minimum lost time. Latest models have capacity of over 3300 brick per hour. We are prepared to furnish complete equipment necessary for economical production.



Our engineers welcome your inquiries and are happy to assist you in planning your entire plant. Write for our interesting details.

JACKSON & CHURCH CO. SAGINAW MICHIGAN



Construction view, showing raising of slabs to position on deck

"CONCRETE FOR PERMANENCE"

So Aggregates Producer Naturally

Rebuilds With Concrete

West Riverside Service Gravel Co. Plant

By C. F. COLTON,

Riverside, California

THE WEST RIVERSIDE SERVICE GRAVEL Co., West Riverside, Calif., with F. A. Braman at its head, was recently confronted with a problem of rebuilding. This rapidly-growing concern was faced with the construction of a larger plant to be able to handle its growing business. This new construction included the building of ten large storage bins 12 ft. in diameter and from 20 to 25 ft. in height. These were to be placed on a concrete deck and elevated high enough to permit the loading of trucks below.

A heavily reinforced floor, 26 ft. by 65 ft. side and center walls all with an average thickness of 18 in. were poured, as was the deck above with a thickness of 20 in. to support the bins.

While the floor, walls and deck were being poured, work was also being done

Why Not?

WE HAVE often wondered and frequently asked why producers of cement and aggregates who operate under the slogan "Concrete for Permanence" did not do more of their own construction in concrete. Most cement manufacturers now use cement—at least for bins or silos. The aggregates producer who uses concrete seems more the exception than the rule. He usually pleads economy. Maybe he's overlooking a bet. What he argues as economy for the other fellow—his customer—may also be economy for him.

—THE EDITOR

on the construction of the bins, for the necessary forms had been made, and the slabs were being poured. The slabs for the bins were each 5 ft. by 7 ft. 6 in. and 6 in. thick. The ½-in. reinforcing rods, 5 in. apart, extended 6 in. past the concrete at each end of the slabs.

The plan which this company followed in the construction of these bins is believed to be unique, and so simplified the work and was such a saving that it is worth considering by those interested in similar construction.

Five of these slabs were planned to make the 12-ft. bin circumference with an 8-in. space between each two of them as they were placed. As the slabs were put in place on the deck, the projecting ends of the rods overlapped and were securely welded. Three vertical ½-in. rods were placed in each space.



Plant of West Riverside Service Gravel Co., showing completed concrete tanks with washer buildings over them



Before erection—the forms and slabs on the ground



Note spaces between slabs of tanks in place on the deck

Since the slabs had been formed on the ground they were quite easily raised and put in place on the deck. Each slab was grooved with a 2-in. half circle thus leaving a 2-in. circular bond to be filled with concrete as the spaces were poured.

The ten bins were placed in two rows of five each, and all fitted close against one another with the spaces matching, thus when the spaces were all poured these ten bins really became as one unit, well bonded together by the 8- by 12-in. concrete columns.

These bins are of 1200 tons live storage capacity, and in view of this tremendous load to be carried, much care was given to the construction, and no reinforcing was spared to make the entire construction ultra safe. Mr. Braman states that the bins are entirely satisfactory, and were much more economical in construction costs than the method generally followed.

The plant has an 80-ton per hour operating capacity, and is well equipped with a fleet of ten trucks, to supply the ever increasing calls of the Riverside and adjacent districts.

This \$150,000 plant is right up-to-date in the use of modern time-saving and accuracy-promoting devices. One is a Fairbanks Printomatic scale. All the buildings are well roofed to protect equipment and workers in all weather. Another unique feature of the plant is found in the construction of the shop building, 75 by 100 ft., with only two supporting posts in the floor space. Two well-constructed trusses extend lengthwise of the building, one on each side of a 25-ft. wide driveway. This driveway has a height clearance of 19 ft. to accommodate the shovels and other machinery that may be brought in for repairs.

The entire plant arrangement shows that to the smallest detail Mr. Braman and his co-workers have not only planned for every present convenience, but that they also had in mind all future expansion—and permanency!

To Make Brick

CONCRETE PRODUCTS CO., Tallahassee, Fla., a new concern, was formed recently to manufacture concrete brick and other masonry products. A \$10,000 plant has been built and machinery to produce 12,000 brick a day has been installed. Brick will be manufactured in four standard colors. Additional machinery is being placed for the manufacture of reinforced concrete floor joists to be used in residential construction and other equipment will be installed to make light-weight tile, concrete fence posts, stepping stones and steps.

New Type Concrete Blocks

MONARCH BUILDERS SUPPLY, INC., Toledo, Ohio, is said to be manufacturing a concrete block by a patented process that is exceptionally waterproof, light in color and to have greater strength than the usual concrete block. These units are being placed in three homes now under construction in and near Toledo.

Prices Bid—Contracts Let

INDIANAPOLIS, IND.: State Highway Commission awarded contract for 700-1000 tons stone delivered to state road 56 to Scott County Stone Co., Scottsburg, at \$1.95 per ton; 1750 to 2000 tons stone f.o.b. Hagerstown to American Aggregates Corp., Indianapolis, at \$1.10 per ton.

HEALDSBURG, CALIF.: City awarded contract for 2300 ft. of concrete pipe to Healdsburg Concrete Pipe Co. at \$4.39 per lineal ft.

JOPLIN, MO.: Independent Gravel Co., Joplin, was awarded contract for city paving with asphaltic concrete at 65¢ per sq. yd.

SAN BERNARDINO, CALIF.: Triangle Rock and Gravel Co. was awarded con-

tract by the federal bureau of public roads to place a sub-base of nine miles of road near Showlow, Ariz.

ALBANY, N. Y.: State Highway Department purchased 1438 tons crushed stone delivered at Hamburg and Blasdel from LeRoy Lime and Crushed Stone Corp., LeRoy, at \$1.94 per ton.

OAKLAND, CALIF.: City purchased 5000 tons crushed rock from L. M. Clough Co. at \$1.24 per ton.

SAN FRANCISCO, CALIF.: City awarded contract for 3900 cu. yd. ready mixed concrete for approach of Golden Gate Bridge to Golden Gate Atlas Materials Co. at \$4.93 per cu. yd.; 5000 cu. yd. ready-mixed concrete to Ready-Mix Concrete Co. at \$5.70 per cu. yd.

YAKIMA, WASH.: Bureau of Reclamation, Denver, Colo., awarded contract for 30,000 tons sand and 38,700 tons gravel for Roza Division, Yakima reclamation project to Yakima Sand and Gravel Co. at \$57,450.

MARSHFIELD, WIS.: City purchased 1000 cu. yd. decomposed granite at \$1.07 per cu. yd. from J. Brandl, Marshfield.

DENVER, COLO.: Bureau of Reclamation awarded contract for 35,000 bbl. portland cement for Boise project to Oregon Portland Cement Co. at \$2.37 per bbl.

New Company Makes Concrete Pipe

BATES-EHLERS-MATHIS CONCRETE PRODUCTS CO., Tishomingo, Okla., has installed new machinery in a new building for the manufacture of concrete pipe. Pipe up to 12-in. diameter are made in a McCracken machine and a Quinn pipe machine is used to manufacture the larger sizes. The plant has a capacity of 100 tons of concrete pipe per day. The company also has on order a block machine.

Universal Cast Stone Co., Joliet, Ill., Concentrates on **CONCRETE HOUSES IN \$5000 CLASS**

And Merchandises These Rather Than Products

By BROR NORDBERG

JAMES J. COLLINS, owner of the Universal Cast Stone Co., Joliet, Ill., a new concern, seems to have found the solution to the Federal Housing Administration's insistent demands for a permanent, fire-proof home that the average American citizen can pay for.

Mr. Collins has been a manufacturer of concrete products for only a few months, but in that time has opened the eyes of prospective home-owners by placing on the market a five-room, fire-proof house that is "tagged" for \$4700, complete with carpeting, linoleum, hot-air heating and a 50-x120-ft. lot. The price is low when one considers that Joliet is distinctly a high-priced real estate city.

The first house, just completed, is of conservative Cape Cod design, with concrete masonry construction throughout and has a full-sized basement. An unusual feature is the house layout, which provides ample living quarters on the first floor for the smallest family subdivisions and has all the heating and wiring installed upstairs so that two 12-x12-ft. bedrooms can economically be arranged by placing partitions and plastering at any future date.

The downstairs floor plan includes a 11-x21-ft. living room with one portion used as a dining alcove, a 9-x12-ft. conveniently equipped kitchen, a 11-x14-ft. bedroom and a bath. The basement is complete with a furnace room and recreation room, with which only the more expensive homes are generally equipped.

Others who intend to merchandise concrete products in the form of finished houses could well profit by following a definite planned procedure such as that used by Mr. Collins. His selling job was done in progressive steps starting with the manufacture of the units themselves.

Selling Steps

First of all, he carefully designed a house according to his own specifications, which he could construct and sell to the average family in the lower income brackets. Care was taken in incorporating details of construction which would meet the approval of the Federal Housing Administration, so that prospective buyers could have available loans insured by that organization.

A tract of land in the attractive Clearview subdivision on Route 44, a mile

and a half south of downtown Joliet, sufficient for 30 homesites, was purchased outright and construction begun. The location selected was one where all modern conveniences would be available to residents and close to a recreation park and a fine swimming pool. Certainly selection of such a site is going to help sell houses and concrete masonry.

Mr. Collins personally supervised construction and judiciously selected masons who were capable of giving him a first-class job of laying masonry. The result was a beautiful exterior, which has elicited much favorable comment from those who have seen the house.

When the first house was completed and equipped with modern furniture, it was landscaped to give a finished appearance. Then, Mr. Collins consulted with the Portland Cement Association and other organizations in regard to methods of merchandising.

It was decided to carry advertising in one of the local newspapers announcing that the house would be opened for inspection. Cooperation was secured from the Joliet *Herald News*, in the form of editorial description tying in with advertising carried by Mr. Collins.



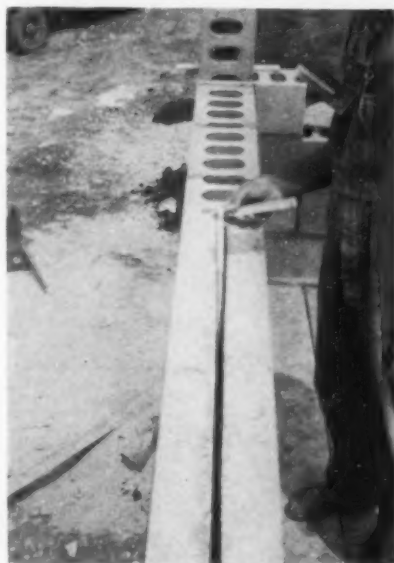
Plant and storage yard of Universal Cast Stone Co., Joliet, Ill.



Aggregates are readily handled from bins on right to mixer in center



Standard and special units are manufactured on power machines



Double precast lintels being placed in concrete house



Specially designed slotted blocks for tight fit around steel sash

His half-page illustrated advertisement announcing official opening of the house for inspection was accompanied by advertisements of the heating equipment and other accessories used in the house construction as well as several smaller ads by the Universal Cast Stone Co.

Several pages, including advertising, were published in the Sunday, July 18, issue. The effect was almost immediate. Hardly had the papers been distributed, when the house was filled with people, many of whom turned out to be first-class prospects. Some 3000 people inspected the house the first day, and almost a thousand persons inspected it on succeeding days.

The house was kept open for inspection for a week and was lighted with floodlights in the evening. A good prospect list was built up by requiring everybody to register. While inspection was going on, two similar houses were under construction on neighboring lots.

Details of Construction

Construction of the house incorporates many new ideas in unit design to provide maximum insulation and fireproofing. The footings are 8-x20-in. reinforced concrete units. All units in the above ground construction are manufactured with Waylite as aggregate.



Construction view of Mr. Collins' first concrete house

gate. The wall exteriors are of 8-x8-x16-in. lightweight blocks.

For added protection, in addition to the high insulating value of the hollow masonry units, furring strips have been placed between the masonry wall and the room interiors to provide a 1-in. air gap. "Rocklath" (gypsum lath) and plaster are placed over aluminum foil, which is next to the furring strips.

The first floor is concrete slab construction super-imposed on 8-in. precast reinforced-concrete joists spaced on 28-in. centers. Several special units were manufactured to increase the insulating value at certain locations in the house and for a tight fit around window and



As proof of the economies of building houses of concrete construction, this Cape Cod home was "tagged" for \$4700, including the lot, hot air heating, linoleum and carpeting

door frames. Air leaks are eliminated around openings by fitting the steel sash into specially designed slotted lightweight blocks.

Precast concrete sills have a groove on the bottom edge of the exterior portion, which are designed to cause rain water to fall directly from the end of the sill to the ground, to prevent weather stains.

Double precast lintels have been made to give an air gap for frost protection and as added insulation. The walls are tied in with reinforcing to the concrete floor slab. For additional strength and rigidity, pencil rods are laid continuously around the wall in the mortar joints directly above the lintels.

The house is painted white with two coats of Wearcote, a washable, waterproof paint manufactured by the American Cement Paint Co., Chattanooga, Tenn.

All units are manufactured in the new, compact concrete products plant located just west of the city limits. Aggregates are brought in adjacent to the bins by the E. J. & E. railroad. Operations started on April 1, 1937.

While the plant is small, being only 64x30 ft. in plan, it has a capacity of 1000 units in each 8-hr. shift. Aggregates coming in by rail are elevated to bins which discharge through chutes to a working platform above and ad-

jacent to the 9-cu. ft. Ideal mixer. The mixer is charged by wheelbarrow.

Most of the standard units are manufactured on a Multiplex power press machine. Specials are made on a Miles power block machine. Special attachments are used for the manufacture of random ashlar units. High early strength cement is used occasionally when demands for block are heavy. All units are steam-cured overnight, summer and winter, in two kilns of 350 block capacity each. The company owns 2½ acres of land which is used for outside curing.

New Plant Makes Concrete Block and Brick

CINDER INSULATION BLOCK CO., Nampa, Idaho, began operations in August at a new plant, manufacturing cinder building block and brick. C. E. Dille, manager, is planning to install a cast stone plant in 1938.

Opens Concrete House for Inspection

PRE-CAST CONCRETE CO., Portsmouth, Ohio, has built the first cinder block house in Portsmouth and recently opened it for public inspection. Construction includes concrete floors, cinder block foundation, concrete joists and steel casement windows.



Made of
Acid Open Hearth
Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.
Established 1857

5909 Kennerly Avenue St. Louis, Mo.
New York — Chicago — Denver
San Francisco — Portland — Seattle

BE FIRST IN YOUR CITY TO MAKE CONCRETE JOISTS



*and cash in on rapidly
growing demand*

The present day trend for fireproof buildings has opened a vast market for precast concrete floor joists. With an R & L CRESCENT JOIST MACHINE you can build for yourself a money-making business that will far exceed your expectations. Only small investment required.

Write for complete details at once.

R & L CONCRETE MACHINERY CO.
KENDALLVILLE, IND.

Lowest Initial and Operating Costs Increase Your Profits WITH



Concrete Transport Mixers

Adaptable to light fast trucks—Simple design and operation—Open top revolving blade construction—Easy charging, control, and inspection—Large yardage with a small investment—Thorough mixing of dry concrete in one minute—Uniform high quality concrete guaranteed.

Write for detailed information and the reports of satisfied operators.

Concrete Transport Mixer Company
650 ROSEDALE AVE. ST. LOUIS, MISSOURI



New plant of the Lima Mixed Concrete Co.

LARGE STONE COMPANY AND NEW CONCERN Merchandising Ready-Mixed Concrete At Lima, Ohio

READY-MIXED concrete, fastest growing division of the rock products and concrete products industries, was introduced to the building trade of Lima, Ohio this spring—and quite successfully—by two concerns. Both of the new and modern plants were placed in operation at about the same time, one concern being a large producer of crushed stone and the second, an entirely new industry.

Lima Mixed Concrete Co.

The latter company, the Lima Mixed Concrete Co., has a new plant constructed in the yards of the Cliff Wood Coal and Supply Co. adjacent to the cement warehouse of that concern. The plant is Blaw-Knox equipped, with a three compartment 80-ton bin partitioned for two coarse aggregates and natural sand fine aggregate. Crushed stone and gravel coarse aggregate are always kept on hand in the bins so that

either may be used according to the demands of the customer. Sand and gravel are purchased from a nearby plant and stone is available from a quarry within the city limits.

Concrete is hauled in two 1½-yd. Jaeger truck mixers mounted on a Ford V-8 and an International truck. Each truck is equipped with a device so that concrete cannot be discharged unless it has been mixed for at least 50 revolutions. The trucks back into a concrete runway below the batcher, receive their charge of aggregates, cement and water and are on their way in two minutes. In the short existence of the company (April, 1937) as much as 160 cu. yd. of concrete have been delivered in a single day of 14 hr. with two trucks and placed in the forms on the job.

Cement is brought in by rail in sacks to the warehouse, from which it is dumped through a spout into the cement weigh hopper. Aggregates are

hauled in by truck from the nearby producing plants and are dumped directly into the bins. The top of the bins is on the truck roadway level.

Concrete Is Wholesaled

All concrete from this plant is sold wholesale to building supply dealers, of which one is the Cliff Wood Coal and Supply Co. Cliff Wood is president of both concerns. The laborers and drivers are furnished by the Cliff Wood Coal and Supply Co.

The only "selling" done by the manufacturing company is through advertising in the local paper, designed to interest dealers to handle ready-mixed concrete. Being a new product in Lima, good advertising space tied in with editorial description was carried in the building section of the local paper telling contractors that a new service product was being made available to them. This opening ad is being followed

by smaller space contracted for in the building section of the Sunday paper.

Such advertising is directed to the public, and carries the line "see your dealer." By this advertising, good leads are made available to dealers handling this concern's product. When prospective customers contact dealers not handling ready-mixed concrete the dealers will likely refer them to other dealers handling this product, or they themselves, if inquiries are sufficiently numerous, will become interested in merchandising the product.

Dealer Arrangement

Retail prices are established by the manufacturing concern and concrete will be furnished only according to specifications governing concrete for the particular use for which the concrete is to be used. Specifications governing are those established for federal projects and those recommended by the state engineering department and the American Concrete Institute. The agreement made with the dealer is a lucrative proposition, making it possible for him to realize a greater profit on his



One of two mixers of Lima Mixed Concrete Co.

cement, by selling it in the form of ready-mixed concrete, than if he sold it in the ordinary channels.

The contract stipulates that the dealer is allowed to use his own cement in filling his orders for concrete, on which he receives a discount of 10c per bbl. from the Lima Mixed Concrete Co.

This is an added incentive to encourage sales of ready-mixed concrete. Sand, gravel and crushed stone are close at hand so that there is no differential between prices to any buyers or dealers. Generally, aggregates are trucked in by the producing concerns.

Four grades of concrete, designed for four classifications of uses, are produced and each is available as a high or low slump concrete. These grades are as follows:

	Approximate Strength 28 days	Approximate Mix	Approximate Slump
No. 1	4500 p.s.i.	1:2:3½	4-in.
No. 1A	3500 p.s.i.	1:2:3½	8-in.
No. 2	3500 p.s.i.	1:2:4	3-in.
No. 2A	3000 p.s.i.	1:2:4	6-in.
No. 3	3000 p.s.i.	1:2½:4	4-in.
No. 3A	2500 p.s.i.	1:2½:4	8-in.
No. 4	2500 p.s.i.	1:3:5	3-in.
No. 4A	2000 p.s.i.	1:3:5	6-in.

Mixes No. 1 or No. 1A are for concrete which is watertight or resistant to severe wear; mixes No. 2, 2A, 3, 3A are used for sidewalks, driveways, garage floors, etc.; and mixes No. 4 or 4A are used for foundations, basement floors, etc., not subject to severe wear or weather. Mixes No. 1, 2, 3 and 4 are designed for flat work and mixes No. 1A, 2A, 3A and 4A are designed for reinforced concrete or concrete placed in forms such as in the construction of beams and walls. Other mixes conforming to recognized specifications are made on request, including high early strength cement mixes.

Price Differentials

Four prices are set for the four classes of concrete, the same price holding whether the concrete be the low or high slump concrete. Price differentials between each of the four grades are 25c, giving four prices for the regular grades of concrete.

In addition to his regular cement discount, the dealer is given a discount of



ABOVE LEFT—Another view of plant and truck runway

BELOW LEFT—Modern plant of National Lime and Stone Co.



A mixer of National Lime and Stone Co.

20c per cu. yd. for early payment. On orders up to 40 cu. yd. his discount is 50c per cu. yd. for commission, and for larger orders his allowance is 35c per cu. yd. For orders of less than one cu. yd., \$1.00 is added for a hauling charge.

Fifteen minutes are allowed for unloading time, and a demurrage charge of \$2.00 per hour is assessed starting 15 minutes after the time of arrival. Prices are set according to whether shipment is to be made in zone 1 or zone 2. Zone 1 includes the area within three miles of the center of the city. For zone 2, from three to six miles from the center of the city, 40 cents is added to the price in zone 1 for each cu. yd. of concrete. Outside of zone 2, an additional charge of 15 cents is added for each cu. yd. per mile. Delivery has already been made on this basis for hauls up to 26 miles in length.

National Lime and Stone Co.

The other new plant is that constructed by the National Lime and Stone Co., Findlay, Ohio, adjacent to its quarry which incidentally is located within the city limits of Lima. The enlarged activities of this concern in Lima were announced in a one quarter page advertisement in the local papers, and other ads are contracted for in these newspapers and those in other nearby communities. Ready-mixed concrete is handled by local dealers and is also retailed directly by the company. Prices are based on a No. 1 zone covering the territory within a three mile radius of the plant and a No. 2 zone up to a six-mile radius. For longer hauls, the rate is proportionately increased.

Steel aggregate bin and weigh batcher of National Lime and Stone Co.

Stone Sand Aggregate

The plant consists of a partitioned 130-ton Butler bin for coarse and fine aggregates, a Butler weigh batcher and a cement handling and storage room. All concrete is made from crushed stone coarse aggregate and stone sand fine aggregate. Stone sand is shipped from one of the company's stone plants just outside of the city, while coarse aggregate is available from stockpiles nearby.

Both aggregates are placed in the batching bins by a Koehring gasoline $\frac{3}{4}$ -yd. clam, which can readily load the bins from one location.

Concrete is delivered in two Ford V-8 trucks equipped with 1-yd. mixers with internal mixing blades, the mixers being manufactured by the Concrete Transport Mixer Co., St. Louis, Mo. The mixers are each equipped for end and side discharges.

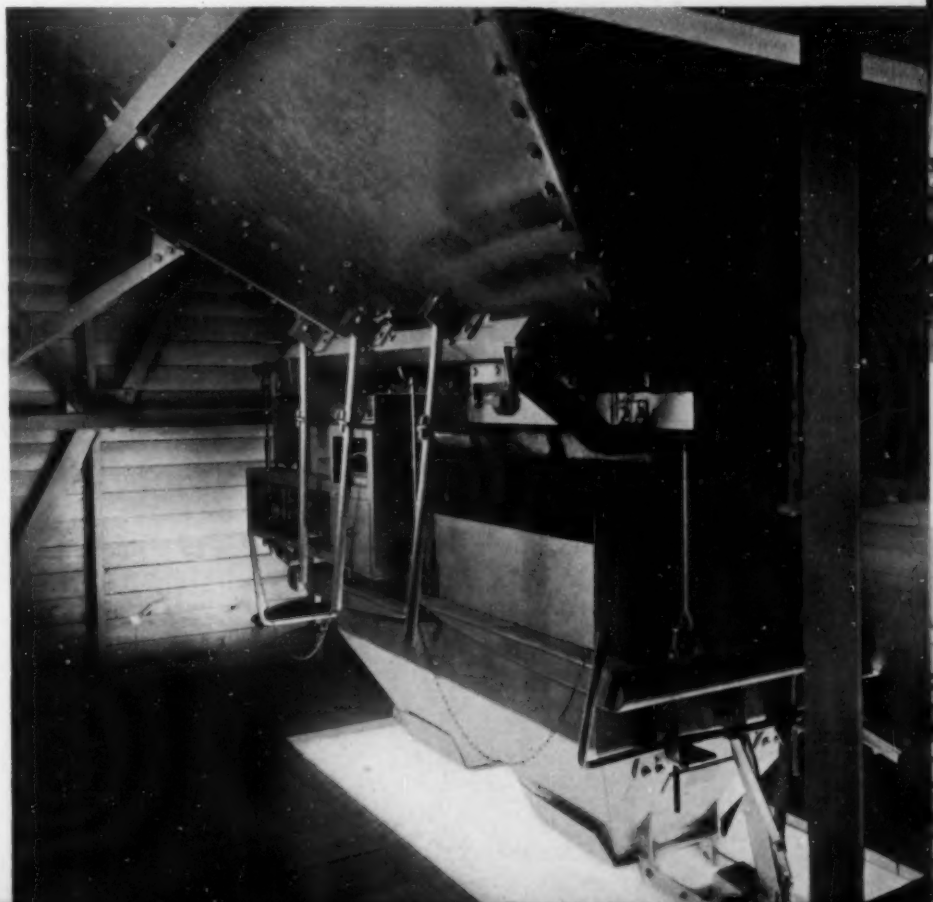
The trucks receive their loads beneath the bins and proceed without backing up. Mixing water is automatically regulated to the mixers by a centralized water tank on the batching floor, which is in turn filled from the city mains.

Increase Storage Facilities

NATIONAL PORTLAND CEMENT CO., Bath, Penn., is completing an 88-ft. extension to its storage building which will give it a total length of 638 ft. The extension is of the same type of construction as that of the original building. The work is being done by the M. A. Long Co., Baltimore, Md. Another Harnischfeger travelling crane with a 3-cu. yd. bucket has been installed. The enlarged building will provide storage for a maximum of 50,000 tons of rock, 7500 tons of coal, 1000 tons of gypsum and 220,000 bbl. of clinker.

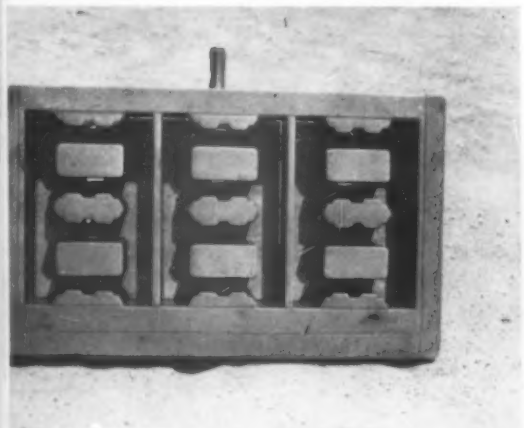
Cut Tax Valuation

CONSOLIDATED CEMENT CORP., Mildred, Kan. plant, tax valuation was recently reduced from \$158,849.99 to \$104,000. This plant has produced no cement since 1931 and is now being dismantled.





Mixer chute on upper left, mix on sloping steel platform, filled mold on vibrating table and stripper in right background



Typical mold showing construction of one designed to produce three units



Filled mold being transferred to stripping machine

Mold on pallet in stripping machine at beginning of the operation



STEPHEN FLAM INVENTS MACHINE FOR Denser Concrete Blocks and Develops a Wider Market

By GEO. D. ROALFE
Contributing Editor

ONE OF THE RESULTS of the recent recovery of the building industry in southern California has been the proportionately larger increase in the use of concrete units. Much of the increased activity in this field can be properly attributed to the increasing menace from termite destruction of the prevailing frame construction and also to the definite improvement in the quality of the concrete units offered for sale. Many of the dry tamp units which are still being manufactured in substantial quantities are extremely porous, a property which has largely prevented their more general acceptance. To overcome this objection the progressive operators have been making constructive efforts to produce denser units.

Of this group the Graystone Tile Co., North Hollywood, has been one of the outstanding examples. It is at this plant that Stephen Flam, of Sherman Oaks, Calif., has made most of his developments resulting in the machines that bear his name. Mr. Flam during the past four years has been supervising officer of masonry construction for the U. S. Indian Service for the southwestern area including the states of New Mexico, Arizona, California, Utah and Nevada. His personal experience in constructing more than 200 buildings with concrete units has been reflected in many improvements, all leading to the simplification of his machine. As it is now built, it has a minimum of parts and weighs complete less than 500 lb., exclusive of molds.

A separate mold is necessary for each unit having a different horizontal cross-section. Units with the same horizontal cross-section can readily be made with thicknesses or vertical heights from 1½ in. to 8 in. The following description together with the illustrations of the successive steps in making a concrete unit will give the reader an adequate idea of the simplicity of the complete operation.

Aggregates

In the plant of the Graystone Tile Co., the aggregates are stored in overhead bunkers which provide gravity feed to the mixer. The mixer is permanently mounted on a timber frame and discharges on to a sloping steel plate platform approximately four feet above the ground. The mix is moved by hand by the molder from this platform into the molds which are filled while resting on a vibrating table. Two types of mixes are used, one having a slump of approximately one half inch for sharply formed units and a wet mix having a slump of approximately four inches. The wetter mix is used in producing artificial flagstone units to meet the current demands of architects. Many of the units are acid stained giving a pleasing assortment of colorings.

Molds

The molds are made with an external steel framework. Attached to this are the cheek plates and steel cores. The bottoms of the molds are made up of steel push plates, whose lowest position can be adjusted so as to give depths of



Pallets with green units stacked seven high in curing yard

A Former Supervising Officer of Masonry Construction, U.S. Indian Service, Develops a Process, a Machine and a Profitable Business in Los Angeles, California, Territory

from 1½ to 8 in. to the mold. The push plates are cut out to conform to the core design and are free to move from their set position to the top of the mold. This movement occurs in the stripping machine when formed units are ejected. In effect the units are extruded from the molds by pressure exerted on the push plates in the stripping machine. The external horizontal dimensions of all molds are substantially the same. They form two 12-in., three 8-in., four 6-in., and six 4-in. units. The mold illustrated is designed for three 8-in. units with three internal core spaces, the ends being recesses for mortar locks. At the top of the pictured mold is shown one of the two pins, the opposite one not showing. They are used in moving and turning the form for stripping. The pin shown at the left is used as a handle by the operator in the stripping machine yoke.

Casting

In casting, the mold is placed on the vibrating table face up. This vibrating table is carried on two cantilever hard wood beams supported beneath the steel mix platform. Vibration is accomplished

by eccentric weights attached to a shaft, belt-driven from a motor. The size of the weights as well as their eccentricity is adjustable. By this means the period and intensity of the vibration can be regulated. Into the empty mold on the vibrating table mixed concrete is scraped from the mix platform. The vibration of the table compacts the mix in the form. When completely filled and vibrated the operator strikes off the mold.

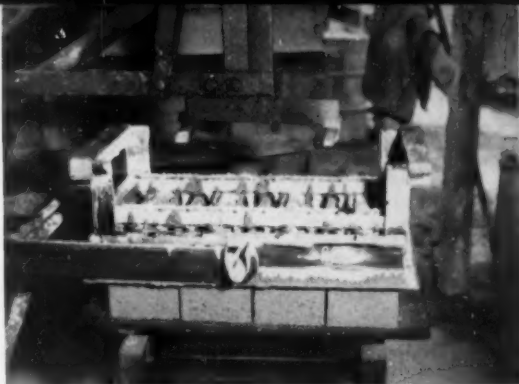
Stripping

The mold, after being struck off, is picked up by a yoke and supported by the stripping machine frame clearly shown in the photographs. It is then rotated through an angle of about 160 deg. and is completely turned over at the same time. On reaching the stripping machine the overturned mold is placed on a wood pallet. The mold, in the yoke support, is held rigidly in a vertical position but the pallet and its support are free to move downward. Ejection of the finished unit is accomplished by a downward pull on the stripping machine lever which forces the units down and clear of the mold. The mold is then swung back, being turned over at the same time, to the vibrating table for refilling.

It is to be noted that it is not necessary to use a pallet to keep the units from falling out of the form while turning the mold over. The compacting action of the vibrating table consolidates the green unit so that the friction holds it in the mold until forced out in the stripping machine. This property also eliminated distortion in handling. The pallet load after stripping is transferred to a roller conveyor and pushed out to the curing yard.

Storing

The ordinary dry mix units are transported to the desired portion of the curing yard on portable sections of roller conveyors supported on wooden horses. There they are stored in stacks



Units after ejection before mold is removed from stripping machine



Units on pallet before removal from stripping machine



Units on roller conveyor for transportation to curing yard

Loading pallets ready for stacking in curing yard



Representative units made on the Flam machine

up to seven high, while green, and covered with burlap and kept moist for two weeks. After preliminary curing they are removed from the pallets and stored in stock piles. At this plant a minimum stock of at least 150,000 units is constantly on hand. Due to the simplicity of the casting operation many special sizes or types are made for specific jobs. A separate inexpensive mold is the only extra expense involved in filling orders of this character.

In the last illustration appears a representative collection of units regularly made on the machine described above at the Graystone Tile Company's plant. Those shown at the left are the artificial flagstone units previously described and made by using the wet mixes. After stripping they sag un-uniformly and do not give the appearance of having been machine made. Many of these are being used in the construction of garden walls and in stone veneering of frame residences. Some are made without core holes and are proving quite popular for stepping stones, walks and other garden improvements.

The production department of this plant employs only three men who can produce an average of 3000 units in an 8-hour day.

All of the units made at this plant have low absorption, rarely exceeding four percent. Standard strengths are obtained with considerably less cement than is possible by ordinary dry-tamped methods.

Future expansion at this plant will be cared for by adding another stripping machine and increasing the labor by adding two men. The vibrating table and mixing equipment are adequate for twice the present capacity.

Concrete Block Firm Back in Business

CULP AND SON CEMENT BLOCK CO., New Rockford, N. D., is planning to re-open its plant after several years of idleness.

Freight Rates Investigated

KENTUCKY CONCRETE PIPE CO., Frankfort, Ky., recently requested that the Kentucky railroad commission investigate freight rates on concrete pipe shipments in Kentucky. It was claimed that existing rates were excessive and illegal.

Making Blocks Too

CENTRAL PRE-MIX CONCRETE CO., Spokane, Wash., has added concrete block manufacture to its line. It is reported the company's volume of business the first six months of 1937 was double that of the same period in 1936.

Table and Benches For Texas Highways

IN HUNDREDS of the roadside parks built by the state highway department in Texas a standardized type of table and benches is being widely used. By using supports of large flat stone or concrete blocks it is possible to construct heavy tables and benches which will not be injured by rough use or accidental



Table and Benches built by the Texas State Highway Department

bumps by careless motorists. The table supports are set on concrete piers sunk into the ground and rise 2 ft. 2 in. above the ground surface. The table top is a slab of reinforced concrete 6 by 3 ft. with a thickness of 4 in. Quarter-inch and three-eighths inch bars are used for the reinforcing. The top as well as the sides of the slab are terrazzo or wire brush finished in order to discourage promiscuous marking of the tables. The benches may be topped with reinforced concrete slabs or constructed entirely of smooth natural stone.

New Concern

STERLING CONCRETE PRODUCTS CO., Sterling, Ill., is manufacturing concrete block and brick in a new plant recently constructed. The manufacture of other types of units will be started in the near future. H. L. Block is general manager of the company, which has downtown offices at the Star Oil Co., Sterling.

\$50,000 Amiesite Plant

AMIESITE CORPORATION OF PENNSYLVANIA is completing construction of a new \$50,000 amiesite plant at the Gray Station stone quarry near Blairsville, Penn. Stone will be obtained direct from the stone quarry crusher by conveyor.

Gravel Rate Hearing

MISSISSIPPI RAILROAD COMMISSION recently held a hearing on the petition of several railroads to increase rates on sand and gravel moving in intrastate commerce in the state.

Concrete Pavement Yardage

AWARDS of concrete pavement for July, 1937, have been announced by the Portland Cement Association as follows:

Type of Construction	Sq. yd. awarded during July, 1937	Total sq. yd. for year to date July 31, 1937
Roads	3,561,956	23,928,564
Streets	1,575,932	7,641,190
Alleys	48,613	279,005
Total	5,186,501	31,848,759

To Make Rock Wool

Rock Wool production is to get under way in September at a new plant in Largo, Ind., equipped with two cupolas. The 236x84-ft. building has provisions for installation of two additional cupolas at a future date. This makes the fifth rock wool plant to go into operation in Wabash county.

Building New Plant

GORDON MILLS and WILLIAM MATTON, Buffalo, Minn., are building a new concrete products plant. The new firm already has secured a number of contracts for concrete tile.

Concrete Block Must be Up to Standard

OMAHA BUILDERS' EXCHANGE, Omaha, Neb., an organization including some manufacturers of concrete masonry, was instrumental in having the city building inspector recently launch an investigation on the claim that a non-member concern was making an inferior product. It was planned to test the products in question under a city ordinance investing the authority to the building inspector.

Indiana Concern Manufactures Concrete Brick

LA PORTE CEMENT PRODUCTS CO., La Porte, Ind., is making Dunbrik to be sold under an exclusive franchise in La Porte county. The process used in the manufacture of these units reduces the water absorption of the units to five per cent, an unusually low figure. Sherman Cumerford is president and E. Bert Watson is secretary-treasurer.

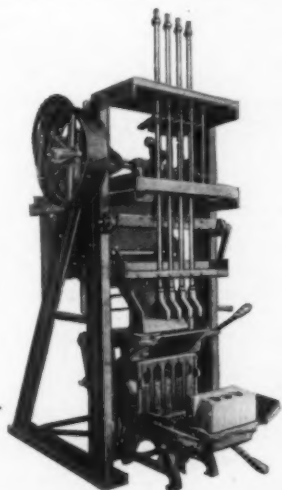
Elected by Dealers

WYOMING CONCRETE PRODUCTS CO., Casper, Wyo., H. P. Gutz, manager, was recently elected president of the newly formed Wyoming dealers association, an organization of about 60 Wyoming dealers who sell materials to county governments.

ROCK PRODUCTS

Phosphate Activity in Tennessee

SHIPMENTS of phosphate from the Tennessee fields are again moving at a rapid rate and the general increase in phosphate activity is reflected in a phenomenal building boom at Columbia, Tenn., in the heart of the phosphate fields. Building has also started at Mt. Pleasant, Tenn., where for five or six years the supply of housing facilities far exceeded the demand, due to the depression in the phosphate industry.



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Anchor Concrete Mch. Co.

G. M. Friel, Mgr.

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Will not fade—extra fine and strong
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STAR and ANCHOR COLORS

Geo. S. Mephram Corp., East St. Louis, Ill.
C. K. Williams and Co., Easton, Penn.

Monsanto Chemical Co. recently took over the Frank Alderson and Marion Sheddan 120-acre tract of land for \$50,000. This tract of land, which joins the Monsanto Chemical Co.'s property, had been under an option contract to TVA. The construction and installation work at the plant of the National Carbon Works, Columbia, is about completed and regular operations are planned to begin early in September.

Monsanto Chemical Co. has several hundred thousand tons of phosphate mined and in storage at the washer and sintering plants to provide against bad weather conditions of winter and spring. Victor Chemical Works has let its contract for the million dollar phosphorous plant at Mt. Pleasant to Stone and Webster.

Mineral Industries Conference

FIFTH ANNUAL ILLINOIS MINERAL INDUSTRIES CONFERENCE is to be held at Urbana, Ill., October 8 and 9, under the joint sponsorship of the Illinois State Geological Survey, the Engineering Experiment Station of the University of Illinois and the Illinois Mineral Industries Committee.

Clyde E. Williams, director of the Battelle Memorial Institute of Columbus, Ohio, will give the main address at the opening session on Friday afternoon. He will speak on "Research in the Mineral Industries," conforming to the purpose of the conference itself, which will stress recent scientific and industrial developments of greatest significance to the mineral industries of Illinois. The following tentative rock and rock products program has been arranged for the afternoon of Friday, October 8:

"The Production and Possibilities for Limestone Rubble and Ashlar for Construction"

By W. R. Sanborn, president, Lehigh Stone Co., Kankakee, Ill.

"Current Researches on Illinois Stone and Their Relation to New Developments in the Stone Industry"

"Progress in the Knowledge of Illinois Soils and Its Relation to Their Need for Agstone"

By E. E. DeTurk, professor of soil technology, University of Illinois.

"Current Developments in Stabilized Gravel and Crushed Stone Roads"

By Ernst Lieberman, chief highway engineer, Illinois State Highway Division.

The program tentatively arranged for the morning of October 9 contains the following subjects of interest to rock products producers:

"Unexploited or Little Known Industrial Minerals of Illinois"

By J. E. Lamar, geologist and head, Non-Fuels Division, Illinois State Geological Survey.

"The Use of Geophysical Apparatus in the Prospecting of Industrial Mineral Deposits"

By H. A. Buehler, Missouri Geological Survey and Water Resources.

"A Summary of the Results of a Study of Methods for Bleaching Non-Carbonate Industrial Minerals in Illinois"

By J. S. Machin, chemist, Geochemical Section, Illinois Geological Survey.

"Magnetic Separators and their Possible Applications to the Beneficiation of Illinois Industrial Minerals"

By J. J. Ferris, chief engineer, Dings Magnetic Separator Co., Milwaukee, Wis.

Possible New Plant

REPRESENTATIVES of one of the largest stone quarries in the country are reported to be investigating the Silverdale quarries, Silverdale, Ark.

To Open Ohio Quarry

FREEMONT STONE CO., Freemont, Ohio, a newly organized concern, is installing machinery for the quarrying and cutting of stone.

Adds Dust Collector

CONSOLIDATED FELDSPAR CO., Trenton, N. J., is planning to install a dust collector in its plant at Brunswick, Maine.

THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

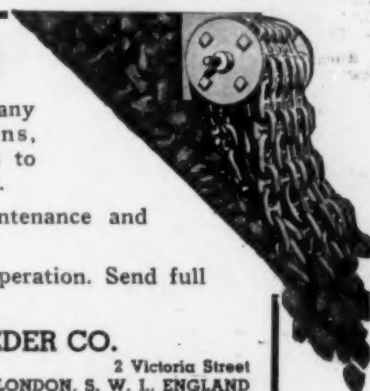
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Safety Contest Winners Announced

UNITED STATES BUREAU OF MINES reports that 328 mines and quarries representing 36 states took part in the twelfth annual National Safety Competition conducted by the Bureau. The winner of each of the five group classifications was awarded the bronze trophy provided by *Explosive Engineer* magazine, the relative standing in the contest being determined by the number of days lost from accidents in proportion to the total number of man-hours worked. The No. 5 limestone mine, Bessemer, Ala., operated by the Tennessee Coal, Iron and Railroad Co. was awarded the trophy for nonmetallic-mineral mines for its record of no disabling accidents for 114,701 man-hours in 1936. The following quarries and nonmetallic mineral mines received honorable mention for operating without lost-time accidents in 1936:

Columbia No. 3 limestone mine, Valmeyer, Ill., operated by the Columbia Quarry Co., St. Louis, Mo. Mine worked 124,028 man-hours.

Krause No. 1 limestone quarry, Krause, Ill., operated by the Columbia Quarry Co., St. Louis, Mo. Quarry worked 224,342 man-hours.

Hanover limestone quarry, Hanover, Penn., operated by the Bethlehem Steel Co. Quarry worked 159,117 man-hours.

Naginney limestone quarry, Mifflin county, Penn., operated by the Bethlehem Steel Co. Mine worked 147,006 man-hours.

Monocacy trap rock quarry, Birdsboro, Penn., operated by the John T. Dyer Quarry Co., Birdsboro, Penn. Quarry worked 138,717 man-hours.

Marquette limestone quarry, Cape Girardeau, Mo., operated by the Marquette Cement Manufacturing Co., Chicago, Ill. Quarry worked 126,621 man-hours.

Holston limestone quarry, Mascot, Tenn., operated by the American Zinc Co. of Tennessee. Quarry worked 125,836 man-hours.

Berkeley Nos. 5 and 6 limestone quarry, Martinsburg, W. Va., operated by the North American Cement Corp., Albany, N. Y. Quarry worked 109,091 man-hours.

No. 3 limestone quarry, Coplay, Penn., operated by the Coplay Cement Manufacturing Co., Coplay, Penn. Quarry worked 100,177 man-hours.

Fogelsville cement rock quarry, Fogelsville, Penn., operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 97,464 man-hours.

Ruegg limestone quarry, Ruegg, Mo., operated by the Missouri Portland Cement Co., St. Louis, Mo. Quarry worked 96,764 man-hours.

Ormrod quarry, Ormrod, Penn., operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 95,012 man-hours.

Blue Mount serpentine quarry, White Hall, Md., operated by the J. E. Baker Co., York, Penn. Quarry worked 82,599 man-hours.

Mason City limestone and clay quarry, Mason City, Iowa, operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 80,425 man-hours.

Middlefield No. 1 trap rock quarry, New Haven County, Conn., operated by the New Haven Trap Rock Co., New Haven, Conn. Quarry worked 79,432 man-hours.

Thomasville limestone quarry, Thomasville, Penn., operated by the J. E. Baker Co., York, Penn. Quarry worked 79,354 man-hours.

LeRoy limestone quarry, LeRoy, N. Y., operated by the General Crushed Stone Co., Easton, Penn. Quarry worked 78,657 man-hours.

Inwood limestone quarry, Inwood, W. Va., operated by the J. E. Baker Co., York, Penn. Quarry worked 76,105 man-hours.

Birmingham limestone and clay quarry, Tarrant, Ala., operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 75,993 man-hours.

Winterset limestone quarry, Winterset, Iowa, operated by the Pennsylvania-Dixie Cement Corp., New York, N. Y. Quarry worked 74,949 man-hours.

Sandts Eddy cement-rock quarry, Sandts Eddy, Penn., operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 73,035 man-hours.

Dexter No. 4 limestone quarry, Nazareth, Penn., operated by the Pennsylvania-Dixie Cement Corp., New York, N. Y. Quarry worked 67,459 man-hours.

Jordanville limestone quarry, Jordanville, N. Y., operated by the General Crushed Stone Co., Easton, Penn. Quarry worked 67,101 man-hours.

Steelton limestone quarry, Steelton, Penn., operated by the Bethlehem Steel Co. Quarry worked 64,956 man-hours.

Glens Falls limestone quarry, Saratoga county, N. Y., operated by the Glens Falls Portland Cement Co., Glens Falls, N. Y. Quarry worked 60,998 man-hours.

Nazareth cement-rock quarry, Nazareth, Penn., operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 60,855 man-hours.

Cowell limestone quarry, Cowell, Calif., operated by the Cowell Portland Cement Co., San Francisco, Calif. Quarry worked 57,836 man-hours.

Akron limestone quarry, Akron, N. Y., operated by the General Crushed Stone Co., Easton, Penn. Quarry worked 57,390 man-hours.

Iola limestone and shale quarry, Iola, Kan., operated by the Lehigh Portland Cement Co., Allentown, Penn. Quarry worked 57,094 man-hours.

Dixon limestone quarry, Dixon, Ill., operated by the Medusa Portland Cement Co., Cleveland, Ohio. Quarry worked 56,997 man-hours.

Lone Star limestone quarry, Hudson, N. Y., operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 54,815 man-hours.

Greencastle limestone quarry, Greencastle, Ind., operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 51,939 man-hours.

Clinchfield limestone quarry, Clinchfield, Ga., operated by the Pennsylvania-Dixie Cement Corp., New York, N. Y. Quarry worked 48,468 man-hours.

Nazareth limestone quarry, Nazareth, Penn., operated by the Nazareth Cement Co., Nazareth, Penn. Quarry worked 46,799 man-hours.

St. Stephens limestone and shale quarry, Jackson, Ala., operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 45,572 man-hours.

Spencer limestone quarry, Spencer, Ind., operated by the Mid-West Rock Products Corp., Indianapolis, Ind. Quarry worked 43,770 man-hours.

Cowan limestone quarry, Cowan, Tenn., operated by the Cumberland Portland Cement Co., Cowan, Tenn. Quarry worked 41,299 man-hours.

Catskill limestone quarry, Catskill, N. Y., operated by the North American Cement Corp., Albany, N. Y. Quarry worked 38,574 man-hours.

Medusa limestone quarry, York, Penn., operated by the Medusa Portland Cement Co., Cleveland, Ohio. Quarry worked 37,562 man-hours.

Marcem limestone quarry, Gate City, Va., operated by the Pennsylvania-Dixie Cement Corp., New York, N. Y. Quarry worked 36,843 man-hours.

Diamond limestone quarry, Middle Branch, Ohio, operated by the Diamond Portland Cement Co., Middle Branch, Ohio. Quarry worked 35,669 man-hours.

Cheshire No. 6 trap rock quarry, Cheshire, Conn., operated by the New Haven Trap Rock Co., New Haven, Conn. Quarry worked 33,241 man-hours.

Birmingham limestone quarry, Birmingham, Ala., operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 32,868 man-hours.

Dallas limestone and shale quarry, Dallas, Texas, operated by the Lone Star Cement Corp., New York, N. Y. Quarry worked 32,371 man-hours.

Gasport limestone quarry, Gasport, Niagara County, N. Y., operated by the Wickwire Spencer Steel Co. Quarry worked 31,666 man-hours.

Thirty-five sand and gravel plants competing in the eighth annual safety competition conducted by the United States Bureau of Mines in cooperation with the National Sand and Gravel Association reported nearly two million man-hours of work during the year 1936. Employees of the plants sustained 77 lost-time accidents, causing 24,584 days of disability.

The Oxford-Fuller plant of the American Aggregates Corp., located at Oxford, Mich., was the winner of the competition in the group of plants working 100,000 man-hours or more. This plant operated 118,328 man-hours in 1936 with eight lost-time accidents causing 54 days of disability. The accident-severity rate was 0.456.

For a record of 41,280 man-hours in 1936 without a lost-time accident, the Orange No. 14 plant of the Consolidated Rock Products Co., located at Orange, Calif., was declared the winner for plants working less than 100,000 man-hours. Trophies provided by Rock Products will be awarded to these two companies at the National Sand and Gravel Association convention at Cincinnati, Ohio, the week of January 31, 1938.

Reports received by the United States Bureau of Mines show that 57% of the accidents were caused by falling objects, haulage, handling objects and machinery and that 43% of the total days lost were from haulage and machinery accidents.

Gravel Company Busy

WISSOTA SAND AND GRAVEL CO., Eau Claire, Wis., reopened its plant at Haugen, Wis. after a \$60,000 fire on June 10. The plant is turning out 50 cars of gravel a day.



THE INDUSTRY

New Incorporations

Continental Concrete Pipe Corp., 228 N. La Salle St., Chicago, Ill.: 200 shares no par value common stock. Incorporators are K. R. Gregory, C. Dedrick and R. K. Dower. To deal in all kinds of concrete drainage pipe. Correspondent: C. T. Corporation System, 208 S. La Salle.

The Neumann Gravel Co., Davis Hill road, Weston, Conn.: amount subscribed for \$25,000, 500 shares par value \$100. Officers and directors Franklin E. Neumann, president and treasurer, Henry A. Rafa, vice president, and Caroline E. Neumann, secretary, all of R. D. No. 2, Westport, Conn.

Hollins Stone Corp., Hollins, Roanoke County, Va. Maximum capital, \$12,000. To operate stone quarries. W. B. Hughes, president, Route No. 1, Roanoke, Va.; Philip Kohen, attorney, Buchanan, Va.

Brown-Rosenbarger Gravel Co., Inc.: change of resident agent to R. E. Ryan, Indianapolis, Ind.

Morton Sand and Gravel Co., has been dissolved as a corporation but will continue to do business under the same name as a company, owned by Martin Morton with Stearns and Jones, 208 West Washington St., as correspondents.

National Marble & Tile Co., Newark, N. J.: 2000 shares, no par value. Agent A. Albert Eichler.

Terry Stone Co. Principal office Charlotte, N. C. To buy and sell building materials. Authorized capital stock 1000 shares, par value \$100, subscribed stock 20 shares, by Julian A. Terry, Mabel C. Moysey and Florence Terry of Charlotte, N. C.

Murphy & Perkins Ready-Mixed Concrete Co., Oklahoma City, Okla. Capital stock \$10,000. G. C. Perkins, Dewey Perkins and C. J. Murphy, all of Oklahoma City, Okla. Charter delivered to Jerome Henry, 1321 First National Bldg., Oklahoma City, Okla.

Ashland Granite Quarries, Inc., Salem, Ore. Incorporators are Emil Peil, Alice A. Peil and M. L. Applegate. Capital stock \$125,000. Filed by Applegate at Ashland.

Piqua Quarries has been incorporated by M. Hall, A. Action Hall and John P. Decker under the title, Piqua Quarries, Inc., Piqua, Ohio, with 400 shares of stock having no par value.

Manahawkin Sand & Gravel Co., Inc., Barnegat, N. J.: \$100,000. Agent Francis Tanner.

Pyrophyllite Tale Products, Inc., Glendon, N. C.: to mine and prepare for market ores, minerals and mineral substances. Authorized capital stock \$50,000, subscribed stock \$500, by H. J. Bryson, Raleigh, N. C.; W. A. Miliken, Lansing, Mich.; W. E. Lindsay, H. O. Waltz and Matt Hines of Mount Airy, N. C.

City Cement Block Co., Inc., Bridgeport, Conn. Capital stock \$20,000; par value \$100, paid, \$10,000. Incorporators are Christopher, Anna and Cevita Monaco.

Great Lakes Gravel Corp., Buffalo, N. Y., with capital of 901 shares. Incorporators are Charles F. Penney, Edward D. Siemer, and Alfred A. Buerger, all of Buffalo.

Kankakee Sand Co., Volkman Building, Kankakee, Ill.: 300 shares par value common at \$50 per share. Incorporators are Fred C. Hamilton, E. B. Hamilton and James C. Johnston. To deal in sand and gravel. Correspondent: Butz, Taylor and Tolson, 423 Arcade Building, Kankakee.

McCormack Sand & Gravel Corp., Manhattan, N. Y.: to deal in sand, gravel and building materials. Correspondent: Jacob I. Goodstein, 21 East 40th St., New York, N. Y. 1000 shares no par value.

Illinois Stone Co., Momence, Ill., to deal and trade in road and building material. Incorporators are: F. Mayer, S. O. Nafzger, and J. C. McCally. Correspondent is C. H. Moore, 608 S. Dearborn St., Chicago, Ill.

Rock Wool Corp. of America, 30 W. Washington St., Chicago, Ill.: 1000 shares no par value common stock. Incorporators are E. H. Lewis, A. Reinsberg, and A. A. Lewis. Correspondent, Edward I. Ellman, 77 West Washington St., Chicago, Ill.

Personals

W. S. Martin, manager and director of the Presbrey-Leland Quarries Co., Brattleboro, Vt., for the past 16 years, has resigned and plans to return to his former home in Westerly, R. I., in October. Mr. Martin went to Brattleboro, Vt., in 1921.

R. W. Henderson has been transferred from South Dakota to southern Iowa as a sales representative of the United States Gypsum Co.

George A. Mattison, Jr., was elected to succeed his deceased father as president of the Woodstock Slag Corp., 701 Transportation Bldg., Birmingham, Ala.

Obituaries

Martino Bertolini, 25 Ayers St., Barre, Vt., granite manufacturer, died August 13. He has been in failing health for the past two years.

Charles Musgrave Camm, a member of the sales force of the Giant Portland Cement Co. for more than 40 years, died August 6th at his home, 106 E. Gowen Ave., Philadelphia, Penn., after a short illness.

Antonio Lanese, 69, president of the Newburgh Sand & Gravel Co., Cleveland, Ohio, died August 1. He lived at 15910 Kinsman road, Shaker Heights, Cleveland.

C. C. McConville, 63, superintendent of the Clintonville factory of the Four Wheel Drive Auto Co., died on August 10 of a heart attack while at work.

George Paul Miller, aged 49, died August 11 at his home in Naperville, Ill. From 1917 to about 1925 he was manager of Rock Products, being one of the original associates of the late William D. Callender when he purchased the journal in 1917. Later Mr. Miller was manager of the *National Builder* and publisher of the *Home Builder*, which he founded. He retired from active business connections several years ago and had been seriously ill for a long time.

Melvin Mitchell, 41, died August 1, exactly twelve hours after being mangled by the discharge of what he thought was a dead fuse, at a gravel pit four miles southwest of Spaulding.

Adrian Ridenour, 35, was killed at Delphos, Ohio, when trapped between flat cars of the Nickel Plate railroad. Ridenour, whose home is at 521 S. Pierce St., operated the steam shovel for the Delphos Quarry Co.

Frank H. Smith, 68, president of the Lawrence Portland Cement Co., Northampton, Penn., died August 10, following an operation of several weeks ago.

Besides his connection with the cement concern, Mr. Smith had served as president and director of the Rahway National Bank, Rahway and Plainfield National Bank, the Monarch Investment Co., and the Monarch Printing Co. He had been a trustee for the Cement Institute and a director of the Plainfield Trust Co., Plainfield Title Guarantee and Mortgage Co., Home Building and Loan Association, Rail and Harbor Building and Loan Association, Eagle Realty and Home Real Estate Co.

A member of the Masonic order, the Elks and Odd Fellow, Mr. Smith was a Past Exalted Ruler of Plainfield Lodge of Elks.

Charles P. Woodworth, 58, vice president of The Weber Chimney Co., Chicago, Ill., died August 12. Mr. Woodworth had been in poor health for a number of years and had not been active in business since 1934.



The Model "135" LOADER

is the fastest loading machine within \$3,000 of its price, as well as heaviest, strongest and most powerful Loader built. It competes with BIG equipment. On a cost-per-yard basis, it's all alone. *Bulletin 134.*

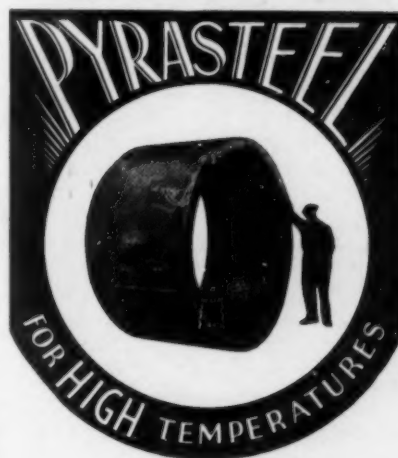
Write, Wire or Telephone

HAISS

George Hais Mfg. Co., Inc., Park Ave. & 143rd St., New York

Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.

Portable Conveyors—Bucket Loaders



1950° F.

That's the temperature the PYRASTEEL kiln end illustrated above withstood during six years service.

PYRASTEEL kiln ends are giving exceptional service throughout the United States and in foreign countries.

PYRASTEEL kiln ends make tight sealing practical and represent the most direct method of fuel economy.

Easy to attach and comes to you completely finished.

CHICAGO STEEL FOUNDRY CO.

37th Street & Kedzie Ave.
CHICAGO, ILL.

Makers of Alloy Steel for over 25 years

UNIVERSAL SCREENS

USERS

ALL

SAY ONE

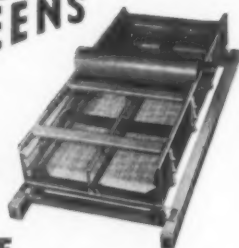
THING... Our files are filled with letters from operators all over the country and every one expresses the complete satisfaction given by **UNIVERSAL SCREENS**.

UNIVERSAL offers you a tried, proven and guaranteed product, the result of constant improvement and refinements since 1919. The outstanding performance of the late model **UNIVERSAL** will surprise and delight you.

The best in Vibrating Screens—yet priced surprisingly low—\$296.00 and up.

Write today for complete catalog.

UNIVERSAL VIBRATING SCREEN CO.
RACINE - WISCONSIN



Sand and Gravel

Mora, Minn.: The village will purchase from Knife Lake the gravel pit at the head of Lake Mora for \$525. The tract contains 11 acres.

Hastings, Neb.: It was announced by the city engineer Perry T. Naylor, that the city had saved approximately \$25,000 in two years by leasing the gravel pit south of Hastings.

Appanoose County, Iowa: Geologists are conducting a search for outcropping stone for use in county work.

Solomon, Kan.: Sand and gravel beds near here have been very productive recently and are furnishing sand for construction on Highway K-18.

Caney, Kan.: A new city rock crusher is to be placed in operation to crush stone for street paving.

Morrill, Kan.: Brown county has put in a screen and crusher at the Heise gravel pit to screen-out oversize rock which will be crushed for paving.

Crushed Stone

Shelbina, Mo.: Twenty-two men have begun work in the E. J. Dempsey quarry to get out 3000 cu. yd. of stone for city construction projects.

Mound City, Mo.: Holt County Court has entered into an agreement with Harold Kunkel to lease part of his land for a rock quarry, for five years, consideration to be in a lump sum and no royalty on the rock quarried.

Spring Hill, Kan.: A new quarry, approximately 500 yd. in length, has been opened on Mr. Ramey's farm and a crusher has been installed which is now in operation.

Franklin, Tenn.: A number of farmers are interested in quarrying their limestone and having the state crusher crush it.

Carrington, N. D.: Work has begun on the New Rockford end of No. 281 road.

Millersburg, Ohio: Fire destroyed one of the main buildings at the Monroe J. C. Miller lime pit near Mt. Hope. Loss was estimated at \$1000.

Winterset, Iowa: Cedar county stone quarry was closed in the middle of July when the project group had completed work.

Manufacturers



Max Hofmann

The Waukesha Motor Co., Waukesha, Wis., has just appointed Max Hofmann to the position of Export Sales Manager succeeding M. E. Nicklin. Mr. Hofmann was with the Argentine branch of Korting Brothers, German Diesel engine building firm before entering the services of the Waukesha Motor Co. where his first activity was in connection with their oil engine development.

Tractor & Equipment Co., Chicago, Ill.: announce the appointment of "Al" Hagele as office manager of the company's new branch at Springfield, Ill.

Pangborn Corp., Hagerstown, Md.: has taken over the Dust Collecting interests of the Blaw Knox Co., Pittsburgh, Penn. M. I. Dorfan, former manager of the Blaw Knox Dust Division, has been reemployed by the Pangborn Corp. to act as general field representative.

The American Rolling Mill Co., Middletown, Ohio: has named Marvin Marsh, who has been a special ARMCO sales representative in the Kansas City territory since January 1, 1935, manager of the company's newly created district office at 7100 Roberts St., Kansas City, Mo.

Fuller Co., Catasauqua, Penn.: announces the appointment of C. C. Kaesemeyer, as service engineer, on the Pacific Coast with headquarters in the San Francisco office. A. W. Quick, who has been the company's service engineer temporarily on the Pacific Coast will return to the main office at Catasauqua. Further changes effective October 1: E. A. Hamer, Chicago office, transferred to the San Francisco office as assistant to J. M. Alonso, manager; A. C. Vaughn to become assistant to H. S. Sayre, manager of the Chicago office.

Chain Belt Co., Milwaukee, Wis.: has erected a new building at its West Milwaukee works so that all the machines used in making parts for concrete mixers, speed prime pumps, Moto-Mixers and Pumpcretes will be located close to the construction equipment plant.

Chicago Pneumatic Tool Co., New York, N. Y.: announces the moving of its Buffalo Sales and Service Branch to 128 W Chipewa St., Buffalo, N. Y.

Tractor & Equipment Co., Chicago, Ill.: announces that Ross Deppe will represent them in the Springfield area between Springfield, Quincy and St. Louis, also that Ed Kelley is returning as northern Illinois representative from Toledo, Ohio.

Cutler-Hammer, Inc., Milwaukee, Wis.: opened a new district office in New Orleans, La., on September 1, with Joseph Gardberg in charge. The new office is at 539 Gravier St.

Four Wheel Drive Auto Co., Clintonville, Wis.: has appointed Chauncey Williams as general factory foreman. The appointment was made following the death of Curran C. McConville, superintendent.

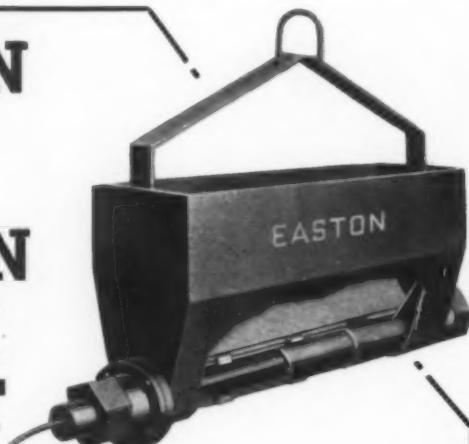
Lincoln Electric Co., Cleveland, Ohio: have opened a news sales engineering office at Dayton, Ohio.

Worthington Pump and Machinery Corp., Harrison, N. J.: announces the appointment of W. A. Neill as manager of engineering

EASTON

Electrically
Heated

BITUMEN WEIGH BUCKET



Discard bulky troublesome steam connections, save money. A bucket with a rotary valve the full length of the bucket — an electrically heated pipe over which the bitumen passes on its way out—giving a perfectly clean and gradual discharge — no mess — no waste and full measure.

If you haven't heard also of our Easton Clarmac Electric Bitumen Heater ask for Bulletin No. 101—does away altogether with steam—reduces cost of heating bitumen and assures a constant and accurate automatic temperature control.

Easton Car & Construction Company
GLENDON STREET
EASTON, PENNA.

ADVANTAGES

1. Non dumping
2. Sprays the bitumen insuring a more even coating of the stone
3. Clean discharge of each bucket full
4. Side walls of the bucket heated
5. No continuous adjustment for tare weight
6. Elimination of all chances of water (or steam) mixing with the bitumen

and sales activities at its recently reopened plant at Holyoke, Mass.

Traylor Engineering & Manufacturing Co., Allentown, Penn., announces the appointment of O. E. Thaleg as manager of the Chicago district office, located at 1



O. E. Thaleg

LaSalle St. Bldg., Chicago, Ill., effective August 1. Mr. Thaleg, formerly assistant district manager in the same office, has had a life-long experience in the sale of crushing and mining machinery.

Johns-Manville Corp., New York, N. Y., has named E. S. Crosby president of the Johns-Manville International Corp., a subsidiary. Johns-Manville Products Corp., another subsidiary, it was announced, has seven promotions. A. R. Fisher, J. P. Kottcamp, and Alexander Cromwell are new vice presidents; J. E. Begert, manager of the Manville plant; K. W. Huffine, manager of the Waukegan factory; H. J. O'Brien, manager of the Alexandria plant and W. Kelty manager of the Coast Reduction Department.



Gail E. Spain

Iron & Steel Products, Inc., Chicago, Ill., has obtained the services of Jack Ryan and Bill Rosser as special sales representatives with headquarters in its city sales office, Room 657 Railway Exchange, Chicago.

The Harnischfeger Corp., Milwaukee, Wis., announces the appointment of C. H. Boenig, Youngstown, N. Y., as P&H sales engineer to handle the entire line of Harnischfeger products for the western section of New York. Mr. Boenig's past connections include vice-presidency of Ball, Gear and Machine Co., general manager of the Malka Water Co.; industrial engineer in charge of the Philadelphia office of the United States Fidelity and Guarantee Co. He was also connected with the United States Government in the Department of Interior for five years, as supervisory engineer, in which capacity he handled highway construction work, construction of sewage disposal plants, filtration plants, bridge construction and public building erection.

Brill Equipment Corp., 183 Varick St., New York, N. Y., is the new corporate name of the Stein-Brill Corp., also a new St. Louis Branch has been established with offices in the Mart Building, St. Louis, Mo.

The American Engineering Co., Philadelphia, Penn., manufacturers of Taylor Stockers and Lo-Hed Hoists, appointed the Sabin Engineering Co., Euclid Sixty-First

Building, Cleveland, Ohio, as their representative in that territory.

The Hilliard Corp., Elmira, N. Y., has placed R. G. Dickens in charge of sales and service of all types of Hilliard Clutches in the Chicago district. For 20 years prior to his transfer to Chicago, Mr. Dickens was Chief Clutch Engineer at the Elmira plant. His office is at 201 North Wells St., Chicago, Ill.

Foot Bros. Gear and Machine Corp., has recently appointed Eugene D. Wilson, 703 Columbian Mutual Tower, Memphis, Tenn., as district representative for that territory.

May Sell Plant

THURBER EARTH PRODUCTS Co.'s fullers earth plant near Woodward, Okla., is reported to be up for sale. About \$500,000 worth of fuller's earth has been shipped from this plant in the past six years.

Seek Phosphate Plant

WYOMING officials are planning to secure for the state a western phosphate plant similar to the one now in operation by TVA at Muscle Shoals, Ala. A survey of the large phosphate beds at the junction of the Wyoming, Utah and Idaho state lines will be launched September 15 by state and federal agencies, who will report on their findings at a tri-state conference to be held in October.

More Truck Mixers

McVAUGH READY-MIXED CONCRETE Co., Anderson, Ind., has added three new truck mixers to its delivery fleet.

Chinese Plant

KWANGSI PROVINCIAL GOVERNMENT, China, is tentatively planning construction of a cement plant at Chin Kong, Kwangsi in 1938 to produce about 50 long tons of cement daily.

Completes Construction

LEHIGH PORTLAND CEMENT Co., Allentown, Penn., has completed construction of a new flume at the Metaline Falls, Wash., plant and the power house is again in operation.

Install Dust Collectors

THE FOLLOWING cement plants are installing Norbilo dust collectors:

Missouri Portland Cement Co., Prospect Hill, Mo.

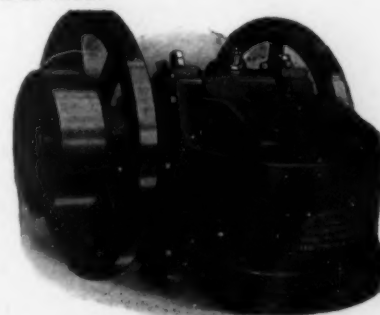
Louisville Cement Co., Louisville, Ky., at the Speed, Ind. plant.

Southwestern Portland Cement Co., Los Angeles, Calif., at El Paso, Texas and Victorville, Calif. plants.

B FARREL CON CRUSHERS

Complete Plants
Designed and
Equipped.

Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.



EARLE C. BACON, Inc.
17 John Street New York, N. Y.

Proved
PERFORMANCE

Money-making performance can be expected of Jeffrey material handling and reduction equipment wherever it is used. For Jeffrey has been building processing and handling equipment for the stone products industry since 1877. Reflecting this long experience and up-to-the-minute engineering . . . Jeffrey-built crushers, elevators, conveyors, feeders, chains, screens, washers, loaders and unloaders assure steady output, a finished product of uniform quality.

For the sake of economy and efficiency . . . for maximum freedom from costly and annoying maintenance problems in processing and handling . . . call on Jeffrey engineers. They rely on experience.

The Jeffrey Manufacturing Co.
935-99 N. Fourth St., Columbus, Ohio

Second to NONE

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ROCK PRODUCTS dominates all papers in this industry in display advertising. ROCK PRODUCTS sells more equipment and supplies for its advertisers than any other medium. The overwhelming reader acceptance proves it. The facts are plain.

Read by everyone in the plant, the president, the top executives, engineer, chemist, superintendent and foremen, the men in charge of operations and responsible for plant efficiency.

ROCK PRODUCTS is the one strong salesman for advertisers and is worth more than a host of "weak sisters." It gets results.

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ROCK PRODUCTS readers pay two and three times as much for their subscription as for any other paper in the field. There is a definite reason.

Successful servicing of an active market demands a publication with editorial vitality which in turn makes readers who are preferred by our advertisers. Men who are alert to their opportunities, men who are making important decisions, buying the equipment, creating new markets, all read ROCK PRODUCTS. These are the consistent readers for one and only one reason . . . ROCK PRODUCTS is essential to their business. They are kept in constant touch with new developments, new practices, new methods, that are helpful to their progress.

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205 West Wacker Drive

Chicago, Illinois

Only **BLAW-KNOX**

RENDERS THIS COMPLETE SERVICE TO READY MIX OPERATORS

Because the service is complete in all details—it is certainly most advantageous for users to purchase all of their equipment requirements for ready mixed concrete operations from one dependable source

BLAW-KNOX COMPANY • PITTSBURGH, PENNA.

1

TRUCK MIXERS

Blaw-Knox TRUCK MIXERS are the most improved design on the market today, embodying mixing efficiency; ease of operation; accurate water measurement; speedy mixing; freedom from breakdowns; low maintenance costs; long life; safety and convenience. Made in all sizes.



2

AGITATORS

Blaw-Knox AGITATORS, for hauling pre-mixed concrete, are designed to carry the maximum rated capacity of concrete for agitating with a liberal factor of safety. They are made in 1½; 2; 3; 4½; and 6 cu. yd. sizes with either separate engine drive or power take-off.



3

TRUCK MIXER LOADING PLANTS

Blaw-Knox Truck Mixer Loading Plants include conveying equipment for unloading shipments of aggregates and cement; elevating these materials into storage bins; storage bins for the aggregates and cement; manual or automatic types of batching equipment for aggregates, cement and water, and all necessary chutes and accessories for the complete plant installation.



4

READY MIXED CONCRETE PLANTS

Blaw-Knox Company designs and furnishes complete Central Mixing Plants including conveying equipment for unloading cement and aggregates and elevating into storage bins; storage bins for aggregates and cement; batching equipment for aggregates, cement and water, or manual or automatic types; and the various accessories needed for the complete plant installation.



← **BLAW-KNOX CATALOG NO. 1582 Describes This Complete Service**

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- Airveyor**
Fuller Co.
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Fuller Co.
Nordberg Mfg. Co.
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- Bearings (Tapered Roller)**
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Timken Roller Bearing Co.
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Flexible Steel Lacing Co.
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- Belting (Metal Conveyor, High & Low Temperature)**
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Manhattan Rubber Mfg. Co.
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Manhattan Rubber Mfg. Co.
- Belting (V Type)**
B. F. Goodrich Co.
Manhattan Rubber Mfg. Co.
- Belts (Fan)**
Manhattan Rubber Mfg. Co.
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- Bin Gates**
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Universal Road Machinery
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- Classifiers**
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Hardinge Co., Inc.
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Nordberg Manufacturing Co.
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American Steel & Wire Co.
Broderick & Bascom Rope Co.
(Yellow Strand)
Macwhyte Co.
United States Steel Corp.
Williamsport Wire Rope Co.
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- Coal Pulverizing Equipment**
Babcock & Wilcox Co.
Gruendler Crusher & Pulv. Co.
Hardinge Company, Inc.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.
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- Colors, Cement**
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Tammis Silica Co.
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- Concentrators (Slurry, etc.)**
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- Concrete Joist Machine**
R & L Concrete Machinery Co.
- Concrete Slab Raising Equipment (Mud-Jack)**
Koehring Co.
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- Conveyor Idlers and Rolls**
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Fuller Company
Geo. Haiss Mfg. Co., Inc.
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Chain Belt Co.
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9 years
LOW-COST SERVICE
WITH GULF HARMONY OIL D
IN OUR COMPRESSORS"...
SAYS MILL MANAGER

"We have had remarkable freedom from carbon deposits on valves, in inter-coolers and discharge lines of our air compressors," says this mill manager. "Gulf Harmony Oil D has given us nine years' *low-cost* service."

A good record—but one that is being equalled in scores of plants which have standardized on Gulf Quality Lubricants. Users of Gulf products—from Maine to Texas—have the benefit of ex-

pert engineering counsel from a Gulf engineer who recommends the best lubrication practice for every type of compressor.

You pay nothing extra for this kind of lubrication service. The next time a Gulf engineer calls at your plant, ask him to look over your compressors and recommend proper lubrication for them. This safety measure will help you get low-cost operation for *your* equipment.

MAKERS OF GULF NO-NOX ETHYL GASOLINE AND GULFPRIDE OIL

Gulf Oil Corporation



Gulf Refining Company

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

Classified Directory—Continued

Couplings (Hose, Pipe, etc.)
R. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Co.

Cranes (Clamshell)
Bucyrus-Erie Co.
Koehring Co.

Cranes (Crawler and Locomotive)
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc.
Link-Belt Co.
Northwest Engineering Co.

Cranes (Excavator)
Koehring Co.

Cranes (Overhead Traveling Electric)
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
American Pulverizer Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Pennsylvania Crusher Co.
Traylor Engineering & Mfg. Co.

Crushers (Hammer)
American Pulverizer Co.
The C. O. Bartlett & Snow Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machinery Co.
Earle C. Bacon, Inc.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Fdry. & Mach. Co. (Jaw)
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Universal Road Machinery
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Austin-Western Road Machinery Co.
Earle C. Bacon, Inc.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
Traylor Engineering & Mfg. Co.

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Austin-Western Road Machinery Co.
Gruendler Crusher & Pulv. Co.
New Holland Machine Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
American Pulverizer Co.

Crushers (Single Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pettibone Mulliken Corp.
Sturtevant Mill Co.

Dedusters
Blaw-Knox Co.

Detonators
Atlas Powder Co.

Dewatering Machines
The Dorr Co.

Diaphragms (Pump)
R. F. Goodrich Co.
Manhattan Rubber Mfg. Co.

Dippers (Manganese Steel)
American Manganese Steel Co.

Dippers & Teeth
Pettibone Mulliken Corp.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.

Dirt Moving Equipmt.
Austin-Western Road Machinery Co.

Dirt Moving Equipmt. (Dumpton)
Koehring Co.

Ditchers
Bucyrus-Erie Co.

Draglines
Austin-Western Road Machinery Co.
Bucyrus-Erie Co.
Link-Belt Co.
Northwest Engineering Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros., Inc.

Dragline Excavators
Bucyrus-Erie Co.
Lima Locomotive Works, Inc.
Northwest Engineering Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.
Manhattan Rubber Mfg. Co.

Drill Bits
Timken Roller Bearing Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Combustion Engineering Corp.
Hardinge Company, Inc.
W. S. Tyler Co.

Dump Bodies (Truck)
Athy Truss Wheel Co.

Dumptoners
Koehring Co.

Dust Collecting Systems
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
The C. O. Bartlett & Snow Co.

Dust Conveying Systems
Fuller Company

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman Hoff Co.

Dynamite
Atlas Powder Co.

Electric Cables and Wires
American Steel & Wire Co.
United States Steel Corp.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Elevator Belting (See Belting)

Emery Mills
Sturtevant Mill Co.

Engineers
The Dorr Co.
Fuller Co.
Hetherington & Berner, Inc.

Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel)
Nordberg Mfg. Co.

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Austin-Western Road Machinery Co.
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.

Fans
General Electric Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Earle C. Bacon, Inc.
Hesser Mfg. Co.
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc. (Weighing)
Jeffrey Mfg. Co. (Pan & Tube)
Robins Conveying Belt Co.
Ross Screen & Feeder Co.
Smith Engineering Works (Plate)
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman Hoff Co.

Furnaces
Combustion Engineering Corp.

Fuses
General Electric Co.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Galvanized Wire Strand
Macwhyte Co.

Gaskets
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Co.

Gasoline
Socony-Vacuum Oil Co.
Texas Company

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

Gears and Pinions
Chain Belt Co.
General Electric Co.
Link-Belt Co.
Pettibone Mulliken Corp.

Gelatin and Semi-Gelatin (See Explosives)

Grapplers
Blaw Knox Co.
Hayward Co.
Owen Bucket Co.

Grease
Gulf Refining Co.
Socony-Vacuum Oil Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Jeffrey Mfg. Co.

Grinding Wheels
Manhattan Rubber Mfg. Co.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Pettibone Mulliken Corp.
Robins Conveying Belt Co.
Smith Engineering Works

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Engr. & Mfg. Co.

Hammer Mills (See Crushers)

Heaters (Bitumen)
Easton Car & Constr. Co.

Hoists
Jackson & Church Iron Wks.
Jaeger Machine Co.

Link-Belt Co.
Northwest Engineering Co.

Hooks
Macwhyte Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Co.

Hose Couplings (See Couplings—Hose, Pipe, etc.)

Hydrators
Blaw-Knox Co.
Jackson & Church Iron Wks.

Insulation (Electric)
General Electric Co.

Kilns (Rotary)
Chicago Bridge & Iron Co.

Kilns (Shaft)
Hardinge Company, Inc.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Hardinge Co., Inc.
F. L. Smidth & Co.

Kominuters (See Mills)

Laboratory Crushers
Birdsboro Steel Foundry & Machine Co.
C. G. Buchanan Co., Inc.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Lamp Guards
Flexible Steel Lacing Co.

Lighters, Hot Wire (For Safe Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Hardinge Co., Inc.
Link-Belt Co.
Raymond Pulverizer Division

Lime Kilns (See Kilns and Coolers, Rotary)

Lime Putty Plants
Chicago Bridge & Iron Co.

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
R. F. Goodrich Co.
Manhattan Rubber Mfg. Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Geo. Halsey Mfg. Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Northwest Engineering Co.
Robins Conveying Belt
Universal Road Machinery

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel Electric)
Davenport-Besler Corp.

The Fate-Root-Heath Company

Locomotives (Diesel Mechanical)
Davenport-Besler Corp.

Locomotives (Gas-Electric)
Davenport-Besler Corp.

The Fate-Root-Heath Company

Locomotives (Oil-Electric)
The Fate-Root-Heath Company

Locomotives (Storage Battery)
General Electric Co.
Jeffrey Mfg. Co.

Locomotives (Steam, Gas and Electric)
Davenport-Besler Corp.

The Fate-Root-Heath Company

General Electric Co.

Log Washer
McLanahan & Stone Corp.

Smith Engineering Works

Lubricants
Gulf Refining

Socony-Vacuum Oil Co.
Texas Company

Cement Plants Economize With **AMSCO-ALLOY!**

AMSCO Alloy plays an important role in the cement industry the world over. In manufacturing processes where high temperatures are encountered, heat and corrosion resisting AMSCO Alloy castings guard against losses resulting from frequent replacements of parts that are inadequate for extreme conditions.

It is the nature of AMSCO Alloy to resist heat and corrosion, not accidentally, but because it was specifically developed for that purpose in the AMSCO Metallurgical Laboratories. AMSCO Alloy, properly applied, will not burn, bend, crack, warp or scale and will resist corrosion and heat to 2100° F. It outlives cheaper metals, intended for the same purpose, by a wide margin.

AMSCO Alloy is composed of chromium, nickel, iron, and other elements; the percentages of these constituent elements being carefully controlled to provide the required high temperature strength and corrosion resistance for a given operation.

AMSCO Alloy Heat and Corrosion Resistant Castings are widely used in the cement industry for: slurry feed pipes, hot clinker drag chains, liners and lifters for clinker coolers, kiln end nose rings, cone segments, and retaining angles, dampers, and other applications where high temperatures are involved.

Plant operators are invited to write for details on AMSCO Alloy cast parts for lowering cement processing costs.

AMERICAN MANGANESE STEEL COMPANY

Division of The American Brake Shoe & Foundry Company
377 East 14th Street, Chicago Heights, Ill.

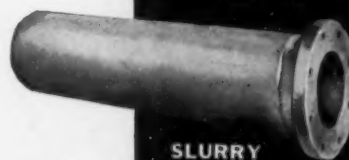
Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.;
Los Angeles, Calif.; St. Louis, Mo. Offices in Principal Cities

AMSCO

TRADE MARK REGISTERED



**COOLER LIFTER
CASTINGS**



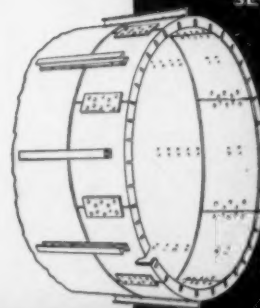
**SLURRY
FEED PIPE**



**CLINKER COOLER
SPOUT**



**KILN NOSE RING
SEGMENTS**



**PATENT
NOSE RING**



KILN END CONE SEGMENTS

Here's How DEMPSTER DUMPSTER Saves Time



Detachable buckets are conveniently spotted at loading points and filled while previously filled buckets are being hauled to destination. Then the process is repeated. Trucks are constantly on the go.

No heavy costly equipment to eat into profits—no delay—no waiting—no high upkeep costs—no disappointments.

A hoisting device which raises bucket to desired height can be installed on your present trucks if desired. It's the modern, easy, fast, economical and efficient method of hauling material more profitably.

"Units furnished to handle detachable containers in the following sizes: 1 cu. yd., 1½ cu. yd., 1¾ cu. yd., and 2 cu. yds."

Let us show you how **DEMPSTER-DUMPSTER** can save time and money for you. Write today for complete facts.



DEMPSTER BROTHERS, INC.
KNOXVILLE, TENN.

Classified Directory—Continued

Lubricants (Wire Rope)

American Steel & Wire Co.
Broderick & Bascom Rope Co.
(Yellow Strand)
Macwhyte Co.
United States Steel Corp.

Machinery Guards

Harrington & King Perf. Co.
W. S. Tyler Co.

Magnets

General Electric Co.

Magnetic Pulleys

Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Manganese Steel Castings

American Manganese Steel Co.
Pettibone Mulliken Corp.

Manganese Steel Parts

American Manganese Steel Co.

Material Handling Equipment

Austin-Western Road Machinery Co.
Jeffrey Mfg. Co.

Mechanical Rubber Goods

B. F. Goodrich
Manhattan Rubber Mfg. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)

Babcock & Wilcox Co.
Hardinge Company, Inc.
Jeffrey Mfg. Co.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)

Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Raymond Pulverizer Division
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Mine Car Hitches

Macwhyte Co.

Mine Handling Equipmt.

Chain Belt Co.

Mixers (Commercial Concrete)

Jaeger Machine Co.

Mixers (Concrete)

Anchor Concrete Machy. Co.
Besser Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jaeger Machine Co.
Koehring Co.

Mortar Colors

Geo. S. Mepharm Corp.
Tamms Silica Co.

Motors and Generators (Electric Units)

Allis-Chalmers Mfg. Co.
General Electric Co.

Multiple V Belts

Manhattan Rubber Mfg. Co.

Nozzles (Gravel Washing)

Chain Belt Co.

Nuts (Lock)

Standard Pressed Steel Co.

Oil Burners

Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)

Gulf Refining Co.
Socony-Vacuum Oil Co.
Texas Company

Packings (Pump, Valve, etc.)

B. F. Goodrich
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Co.

Paint (Asphalt)

Texas Company

Pallets

Anchor Concrete Machinery Co.

Besser Mfg. Co.
Commercial Shearing and Stamping Co.
Stearns Mfg. Co.

Pavers (Concrete)

Koehring Co.

Perforated Metal

Chicago Perforating Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Joseph T. Ryerson & Son, Inc.
Wickwire Spencer Steel Co.

Pipe Machines

Besser Mfg. Co.

Pipe Molds (Concrete)

Besser Mfg. Co.
Stearns Mfg. Co.

Plants (Crushing)

Austin-Western Road Machinery Co.
Traylor Engineering & Mfg. Co.

Plants (Sand and Gravel)

Austin-Western Road Machinery Co.
Traylor Engineering & Mfg. Co.

Plants (Stone Crushing)

Austin-Western Road Machinery Co.
Traylor Engineering & Mfg. Co.

Plates (Double Corrugated)

Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors

Fuller Company
Geo. Hales Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit

Austin-Western Road Machinery Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Portable Loaders

Geo. Hales Mfg. Co., Inc.
Jeffrey Mfg. Co.

Powder (Blasting)

Atlas Powder Co.

Power Tampers

Besser Mfg. Co.

Power Transmission Equipment

Chain Belt Co.
Standard Pressed Steel Co.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizer Parts

American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)

Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Road Machinery
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)

Fuller Company

Pumps (Cement)

Fuller Company

Pumps (Cement Slurry)

Allen-Sherman Hoff Co.
American Manganese Steel Co.
The Dorr Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)

Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)

Allen-Sherman Hoff Co.
American Manganese Steel Co.
Bucyrus-Erie Co.

Morris Machine Works

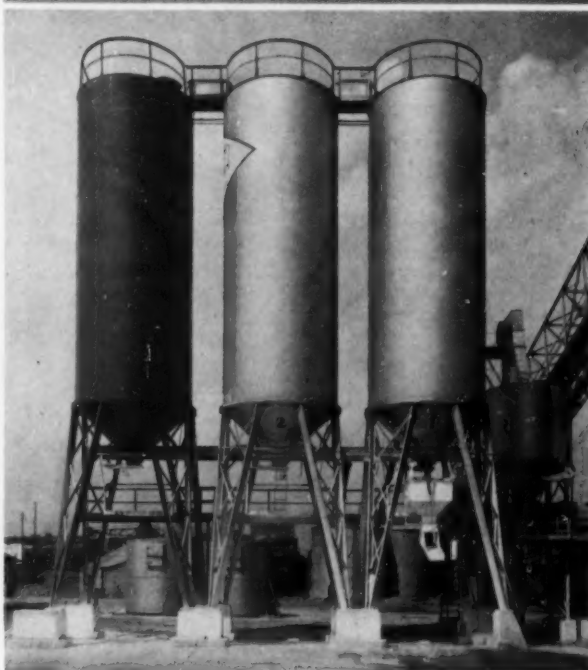
Pumps (Pulverized Coal)

Babcock & Wilcox Co.

Classified Directory—Continued

- Pumps (Sand and Gravel)**
Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Morris Machine Works
Pettibone Mulliken Corp.
A. R. Wilfley & Sons
- Racks or Decks for Lift Trucks**
Besser Mfg. Co.
Chase Foundry & Mfg. Co.
- Railways (Electric)**
General Electric Co.
- Railway Equipment**
General Electric Co.
- Ready Mixed Concrete Plants**
Blaw-Knox Co.
Jaeger Machine Co.
- Ready Mixed Concrete (Truck Mixer Bodies)**
Blaw-Knox Co.
Concrete Transport Mixer Co.
Jaeger Machine Co.
- Reciprocator Feeder for Unloading Hopper Bottom Cars**
Besser Mfg. Co.
- Reinforced Fabric (Concrete)**
Wickwire Spencer Steel Co.
- Road Machinery**
Austin-Western Road Machinery Co.
Blaw-Knox Co.
Harnischfeger Co.
Koehring Co.
Northwest Engineering Co.
- Rock Bits (See Drill Bits)**
- Roll Mills**
Hardinge Co., Inc.
Jackson & Church Iron Wks.
- Rods (Wire)**
Wickwire Spencer Steel Co.
- Roller Bearings**
Timken Roller Bearing Co.
- Roofing (Ready to Lay)**
Texas Company
- Rope, Wire (See Wire Rope)**
- Rotary Screens (Sections and Segments)**
Hendrick Mfg. Co.
- Rubber Covered Screens**
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Co.
- Rubber Goods**
Manhattan Rubber Mfg. Co.
- Rubber Moulded Goods**
Manhattan Rubber Mfg. Co.
- Sack Balers**
Besser Mfg. Co.
- Sand and Gravel Screening and Washing Equipment**
Universal Road Machinery
- Sand Drag**
Smith Engineering Works
- Sand Settling Tanks**
Allen Cone & Machinery Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Manufacturing Co.
Smith Engineering Works
- Scales (Automatic Proportioning)**
Richardson Scale Co.
- Scales (Cement)**
Richardson Scale Co.
- Scrapers (Power Drag)**
Blaw-Knox Co.
Link-Belt Co.
Northwest Engineering Co.
Sauerman Bros., Inc.
- Screens**
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Earle C. Bacon, Inc.
The C. O. Bartlett & Snow Co.
Besser Mfg. Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Hardinge Co., Inc.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
- Industrial Brownhoist Corp.**
Jeffrey Mfg. Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Ross Screen & Feeder Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
Universal Road Machinery
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.
- Screens (Revolving)**
Geo. Haiss Mfg. Co., Inc.
- Screens, Scalping (Hercules and Standard)**
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.
- Screens (Perforated)**
Hendrick Mfg. Co.
- Screens (Testing)**
Hendrick Mfg. Co.
- Screens (Vibrating)**
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Robins Conveying Belt Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.
- Screens, Washing (Hercules, Ajax and Standard)**
Smith Engineering Works
- Screens (Woven Wire)**
Wickwire Spencer Steel Co.
- Screw Conveyors**
Besser Mfg. Co.
- Screw Rewasher (Single and Twin)**
Smith Engineering Works
- Screws (Cap, Self Locking, Set, Hollow Set)**
Standard Pressed Steel Co.
- Scrubbers, Washers**
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works
Taylors Engineering & Mfg. Co.
- Separators (Magnetic)**
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
- Separators (Slurry)**
F. L. Smidth & Co.
- Shovels, Power (Steam, Gas, Electric, Diesel, Oil)**
Austin-Western Road Machinery Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc.
(Ohio Power Shovel Co.)
Link-Belt Co.
Northwest Engineering Co.
(Crawling Tractor)
- Silos**
Chicago Bridge & Iron Co.
F. L. Smidth & Co.
- Skip Hoists and Skips**
Link-Belt Co.
- Slings (Wire Rope)**
American Cable Co., Inc.
American Steel & Wire Co.
Leach & Sons Rope Co.
Macwythe Co.
United States Steel Corp.
Williamson Wire Rope Co.
- Smokestacks**
Chicago Bridge & Iron Co.
- Sockets (Wire Rope)**
American Steel & Wire Co.
Macwythe Co.
United States Steel Corp.

The BROOKS-TAYLOR Lime Putty Plant



INCREASED CAPACITY

The capacity of a standard Brooks-Taylor Lime Putty Plant can be increased by simply installing additional ageing tanks. And the rapidity with which lime putty sanded brick mortar and plaster takes hold usually makes it necessary to provide such additional capacity in a short time.

The Brooks-Taylor plant which the Warner Company operates at Wilmington, Del. is illustrated above. It was originally installed as a standard two-tank unit. The unpainted tank at the left has been added later to supply the increased demand.

The Super Concrete Corporation plant at Washington, D. C. also only had two ageing tanks originally. Less than four months after it was placed in service a third tank was added.

The increasing number of installations, as well as the need for increased capacity at existing plants, seems to verify that aged lime putty produces a superior mortar or plaster at an economical cost. For information on the Brooks-Taylor process, write to the Brooks-Taylor Company, 230 South 31st Street, Birmingham or to the nearest office listed below.

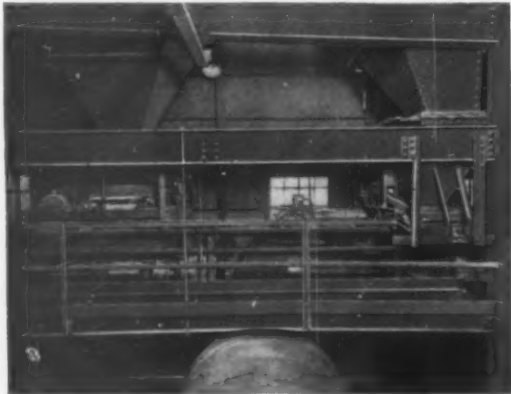
CHICAGO BRIDGE & IRON COMPANY

Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PA.

Chicago...2452 Old Colony Bldg.	Tulsa.....1630 Hunt Bldg.
New York...3396-165 Broadway Bldg.	Houston.....2319 Main Street
Cleveland...2285 Rockefeller Bldg.	Philadelphia...1631-1700 Walnut St.
Detroit.....1553 Lafayette Bldg.	Boston.....1584 Consol. Gas Bldg.
Dallas...1487 Liberty Bank Bldg.	San Francisco...1093 Rialto Bldg.
Birmingham...1505 N. 50th Street	Los Angeles....1458 Wm. Fox Bldg.

Real economies are achieved by using RICHARDSON AUTOMATIC SCALES

ACCURATE WEIGHT: is an economy—your ingredients for the raw or finished mixes can only be truly and exactly proportioned by WEIGHT. This prevents spoiled mixtures, avoids remilling, and saves the Cement Mill real money.



MAINTENANCE—Here is another way where Richardson Scales are a true economy, for they are built sturdily to withstand many years of heavy-duty service and will operate year after year with practically no maintenance expense.

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to find any of your
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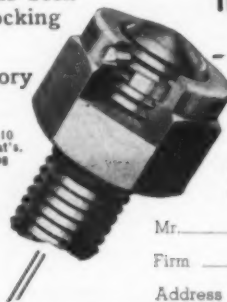


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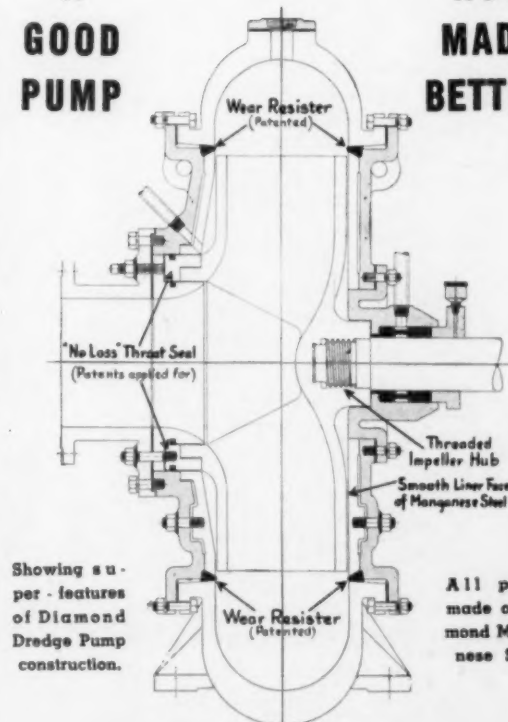
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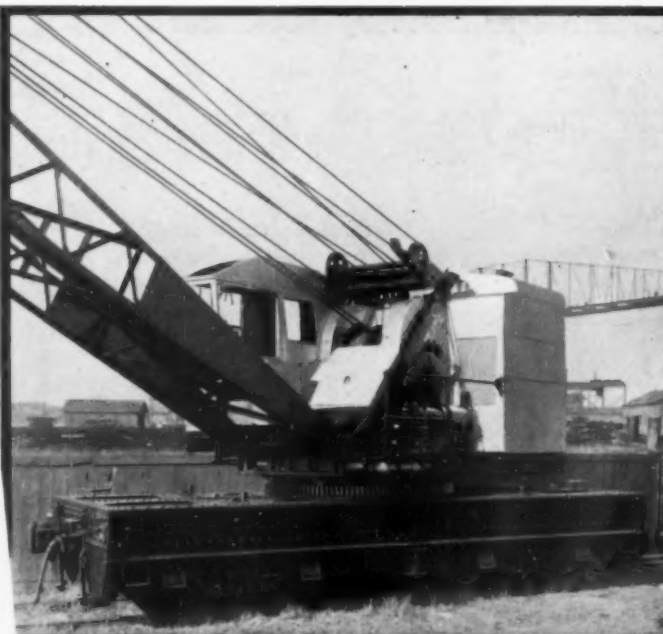
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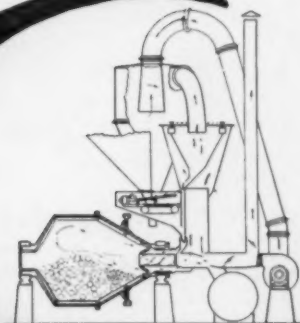
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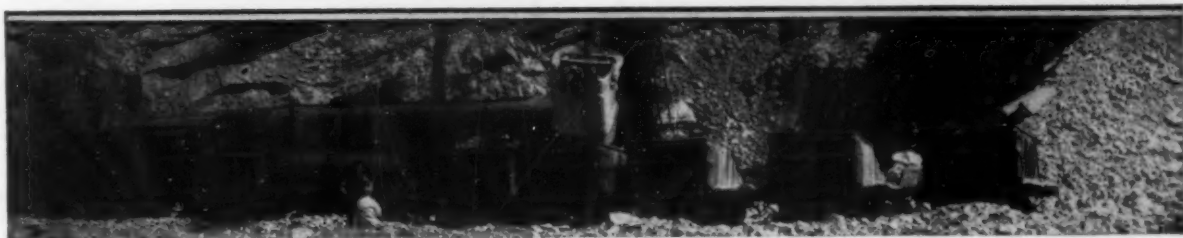


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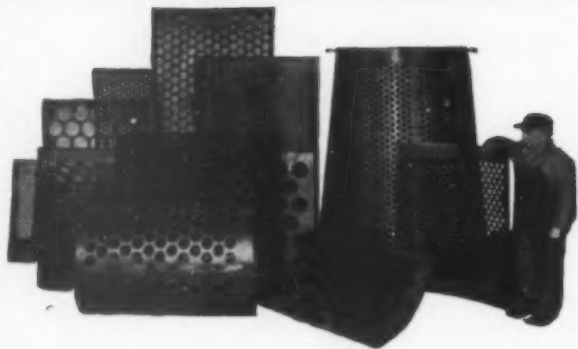
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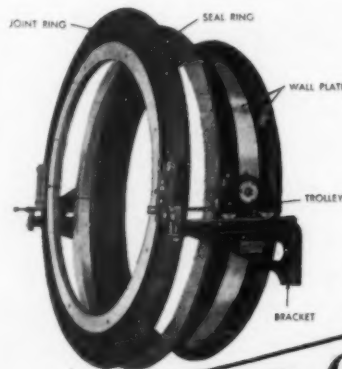
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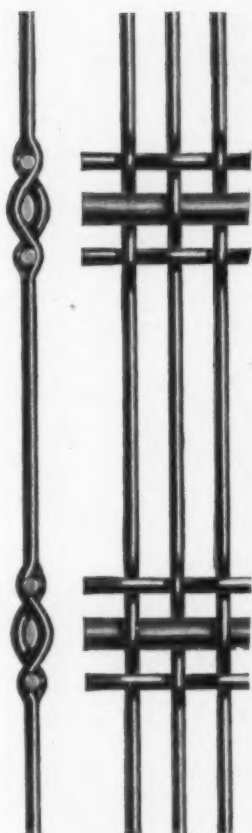


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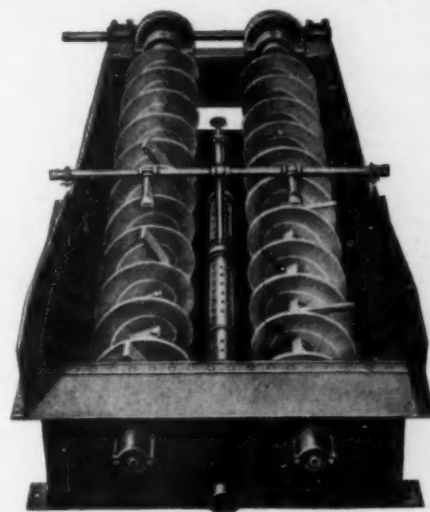
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16 Ton Steel 100' S.L. Derrick.
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15 Ton Northwest 50 ft. Boom Gas Crane.
1000 ft. 18 in. & 24 in. Conveyor Belts.
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Years of operating experience in many hundreds of plants and in many industries have been utilized to produce a screen which contains all these important features: Large Capacity, Positive Action, Durable Construction, Perfect Balance, Freedom from Blinding and Rubber Cushioned Power.

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for Joining and Repairing CONVEYOR BELTS

FLEXCO HD **BELT FASTENERS** **RIP PLATES**

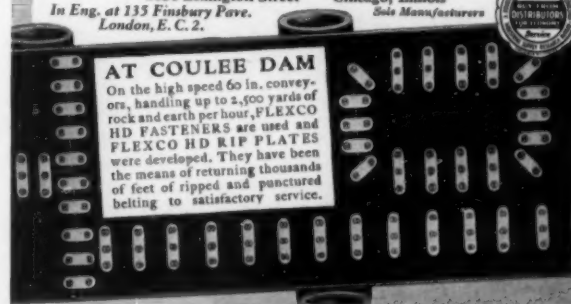


FLEXCO HD BELT FASTENERS make a tight butt joint of great strength and long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

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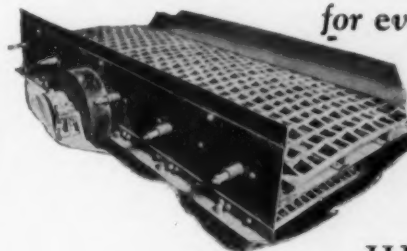
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Portable and stationary, belt with elec. or gas power, sizes from 21 cu. ft. to 1,000 cu. ft.

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1-4 yd. Hayward Class "G" clamshell.
34-Williams, Blaw Knox, Owen clamshell buckets, all sizes & types.
4-Dragline buckets: 1-Northwest 1½ yd.; 2-Page 1½ yd.; 1-Blaw Knox 1 yd.

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Large lot including std. ga. 6 and 12 yd. and 20 yd., 36 in. ga. 5 yd. and 24 ga. 1½ yd.

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1-Central mixing plant consisting of 40-8 1½ yd. Smith tilting mixer, 225-ton Blaw Knox 4-compartment steel bin with 4 beam scale; 1-450 bbl. Blaw Knox round cement bin with weigh batcher & bucket elevators.

CRANES AND DRAGLINES

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1-Moore Speed Crane No. 179, 65' boom, 1 yd. bucket.

SPECIAL 1-Link Belt K-55 Dragline No. 1698

-70' boom, 2 yd. bucket.
1-Wiley model 75 Whirley with 75' boom, fully revolving with 80 HP, 3-D elec. hoist & 30 HP swinger, 20 ton cap.

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1-Byers Bearcat crane, model 26, ser. No. 39474, half circle swing, 1 yd. bucket.
1-Erie type B-2 No. 3909 steam crane, 40' boom, 1 yd. bucket.

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1-Symons size 5½ coarse cone type No. 521.
1-Allis Chalmers size No. 6, style N; openings 12 x 44 in.

2-McCully No. 3 gyratory crushers.
1-Climax No. 2½ jaw crusher, 10x20 in. No. 2837.
1-Telamith No. 9A jaw crusher, ser. No. 6139, 9x16 in.
1-Allis Chalmers smooth type crushing rolls, size 42x16 in.

DERRICKS

5-All steel stiff leg derricks: 1-25 ton Clyde, 50' boom; 1-15 ton Dobbie, 80' boom; 1-15 ton Clyde, 50' boom; 1-15 ton Clyde "A" frame barge derrick, 50' boom; 1-16 ton Insley, 80' boom.

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4-Steel guy derricks, 6 ton cap., Bedford, 80' boom, 90' mast.

DRILLS

6-Wagon drills, Ingersoll Rand & Gardner Denver, with BX71 & GD17 and 21 drills.

LOADERS

1-Barber Greene model 42-A.
1-Hains model A.

LOCOMOTIVES

6-Elec. storage battery type, 4 ton, 24" ga. with battery boxes: 4-Whitcomb; 2-Atlas.
22-Gas locomotives: 6-8 ton Vulcan, std. ga.; 2-7 & 8 ton Whitcomb, 36" ga.; 3-4 ton Vulcan & Davenport, gear drive, 36" ga.; 1-4 ton Plymouth friction drive, 36" ga.; 7-2 ton Whitcomb & Plymouth, gear drive, 24" ga.; 3-Plymouth 4 ton, 24" ga.

PUMPS

4-10" Allis Chalmers centrifugal pumps, direct connected to 2 HP, 440 V. A.C. motors; cap. 3500 GPM, 175' head.

EQUIPMENT BARGAINS

2-No. 66 Smidth Kominuters.
1-6 x 60 Cooler or Dryer, with channel flights.
1-4 x 8 Traylor large size Sheridan Shaking Grizzly; never used.
1-42" Fuller-Lehigh Mill, Shop No. 2123.
1-500 HP Freeman Bonus Water Tube Boiler; 217 4" tubes 20' long.
1-Deane Jet Steam Condenser, No. 57340, 12"x22"x24".
2-Deane Steam Pumps, 7½"x8½"x6", Serial Nos. 81900 and 82325.
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2-Type A Jeffrey Hammer Mills, 24" x 18".
1-Pay & Egan Band Saw No. 192.
2-Open end Bag Packing machines, three-bag and four-bag capacities.

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3-100 HP Westinghouse, 585 RPM, type CCL.
1-50 HP Westinghouse, 585 RPM, type CCL.
3-30 HP Westinghouse, 690 RPM, type CCL.
1-50 HP Allis-Chalmers, 865 RPM.
1-50 HP General Electric, 865 RPM.
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250 pulleys of various sizes and types for sale at one-half new list price; diameters 6" to 128".

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1-Byers 125 gasoline 1¼ yd. dragline—new 1936.
1-Byers 80 gasoline ¾ yd. crane—new 1936.
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Lafayette, Indiana.

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For quick sale.

1 Thew electric ¾ yard shovel located near Chicago.

JOHN P. COURTRIGHT

332 South Michigan Avenue, Chicago

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1-Butler batcher plant 150 yds., 3 compts., weigh batchers, cement bin, conveyors, elevators, complete.
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1-Ransome 1½ yard concrete mixer, Model 428, electric driven.
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1-Northwest crane, 1½ yd. cap., 79' boom.
1-Industrial 15 tons, gas crane.
1-Truck crane, Browning, very fine.
1-Loco. Whitcomb, 20 tons, 36" gauge, gas.
1-Loco. Vulcan, 20 tons, 36" gauge, gas.
1-Loco. Whitcomb, 14 tons, 36" gauge, gas.
1-Loco. Vulcan, 4½ tons, 36" gauge, gas.
1-Rand pump, 8", cent. Gould.
1-Elevator, buckets 8"x12", centers 32".
1-Sauerman gas hoist dhl. drums, 50 h.p.
1-McCormick Deering Model 10 Diesel tractor, bulldozer.
1-Locomotive crane, Ohio 25 tons, 60' boom, overhauled.
1-Jaw crushers, 7x12, 9x15, 11x25, 24x36, also screens.
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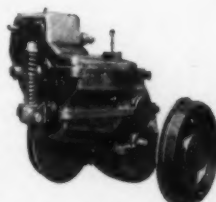
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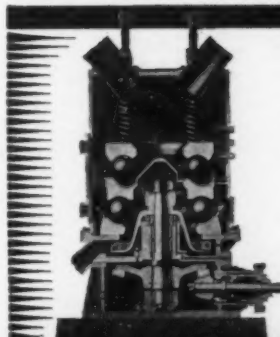
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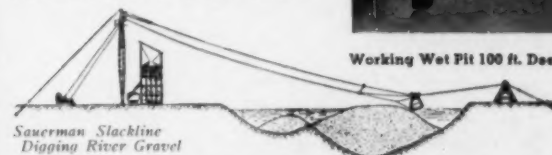
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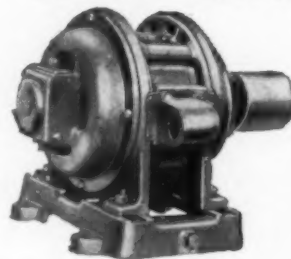
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CRUSHING PLANTS. 2 Complete Plants with all auxiliary equipment, in whole or separate items.

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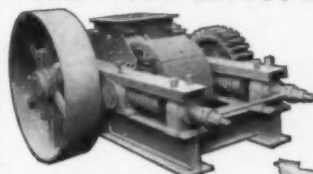
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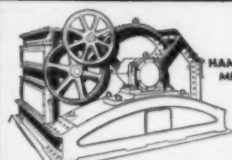
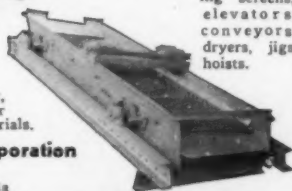
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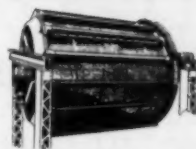
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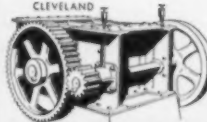


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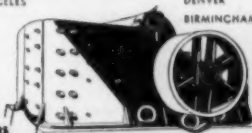
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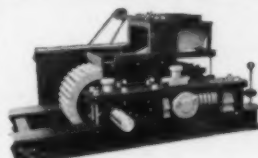
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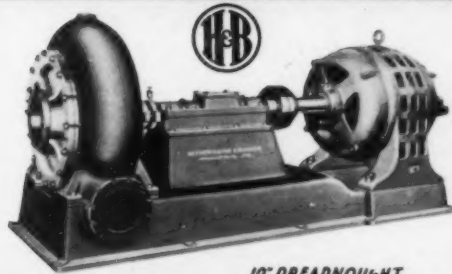
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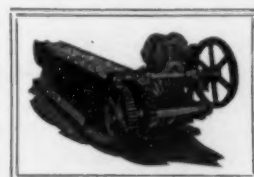
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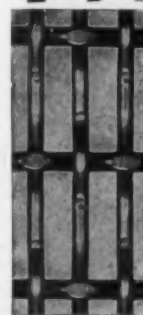
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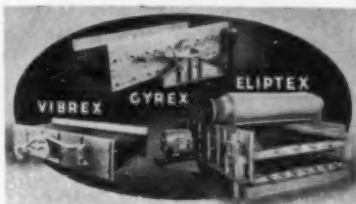
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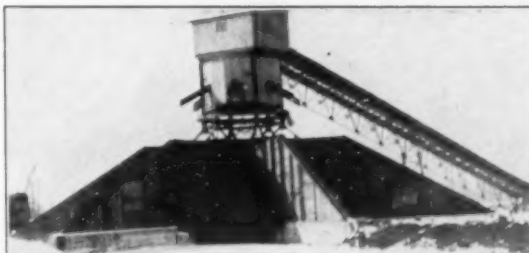


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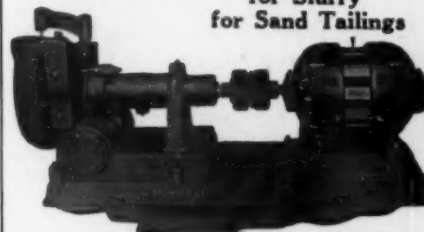
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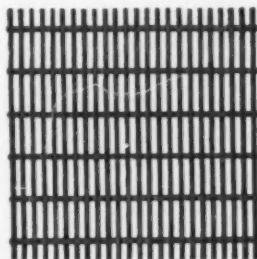


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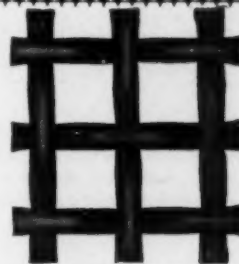
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Our party, accompanied by the superintendent, rode the cars three miles to the face, where we found this loading machine going full blast.

Through the din and dust, we viewed the action. As the cars banged in and out, we tried to watch the cable. Sometimes it was buried in the ever-moving coal; once it was under the tractor tread of the loader. Then it was on top of a car; next time, under the wheels of a car. These things happened despite the helper's efforts to take care of the cable.

Cable Was in Good Shape

The photograph, unretouched, shows the cable rather clearly. Those several tapings covered bruises, the operator said, where the cable was jammed by a "motor" up against the solid block of the loader. Aside from these, however, the cable was in good shape, with few nicks and no signs of wear.

The operator swore that the cable was *great*. The superintendent concurred—said that it was giving excellent service. The same opinion was expressed by other mining men to whom we talked.

Try Out Tellurium Cable

When next you need cable for replacement on any of your cutters, loaders, reel locomotives, electric shovels, or other portable equipment, give G-E tellurium-rubber cable a trial. It is really tough stuff and will give the best of service. Your G-E jobber can supply all types and sizes promptly. For prices and specifications, see Bulletins GEA-1728 and GEA-1918. Address nearest G-E jobber, G-E sales office, or General Electric, Dept. 6E-201, Schenectady, N. Y.

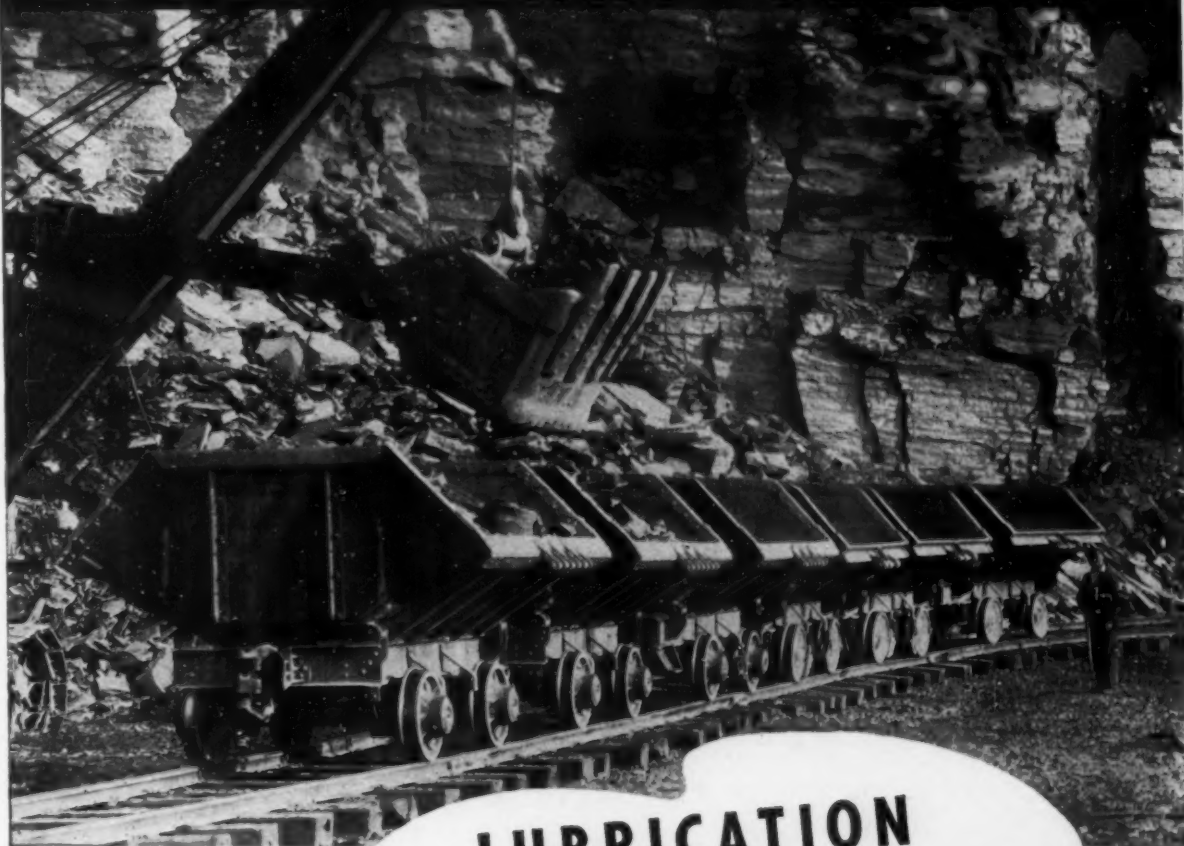
This ad is one of a series written after visits to coal mines in Pennsylvania, West Virginia, and Ohio. Names of the mines and of the men interviewed will be furnished upon request.

GENERAL ELECTRIC

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SEVEN YEARS SERVICE



LUBRICATION Sole Bearing Expense To Date



"Rebel" Streamliners of the Gulf, Mobile & Northern R. R. are Timken-equipped.

GLIDE—as you ride a Timken-equipped train

When the product user tells about performance you can be sure of getting the facts.

The following conversation with the car operator is reported by an executive of the Easton Car & Construction Company, the car manufacturer. Some of the cars referred to are shown above.

"Only yesterday I was interviewing the superintendent of a large cement quarry who is using 8-yard cars with Timken Bearings. We made this installation in 1929.

In talking with him he said that owing to the slackness of business he figured that in the meantime these cars had operated on a full time daily basis equivalent to four or five years. He has never had any repairs, has not ever had to take up any wear in the bearings and added that it is his practice to regrease the bearings every six months, expense of which represents his total expenditure on the bearings since the installation was made."

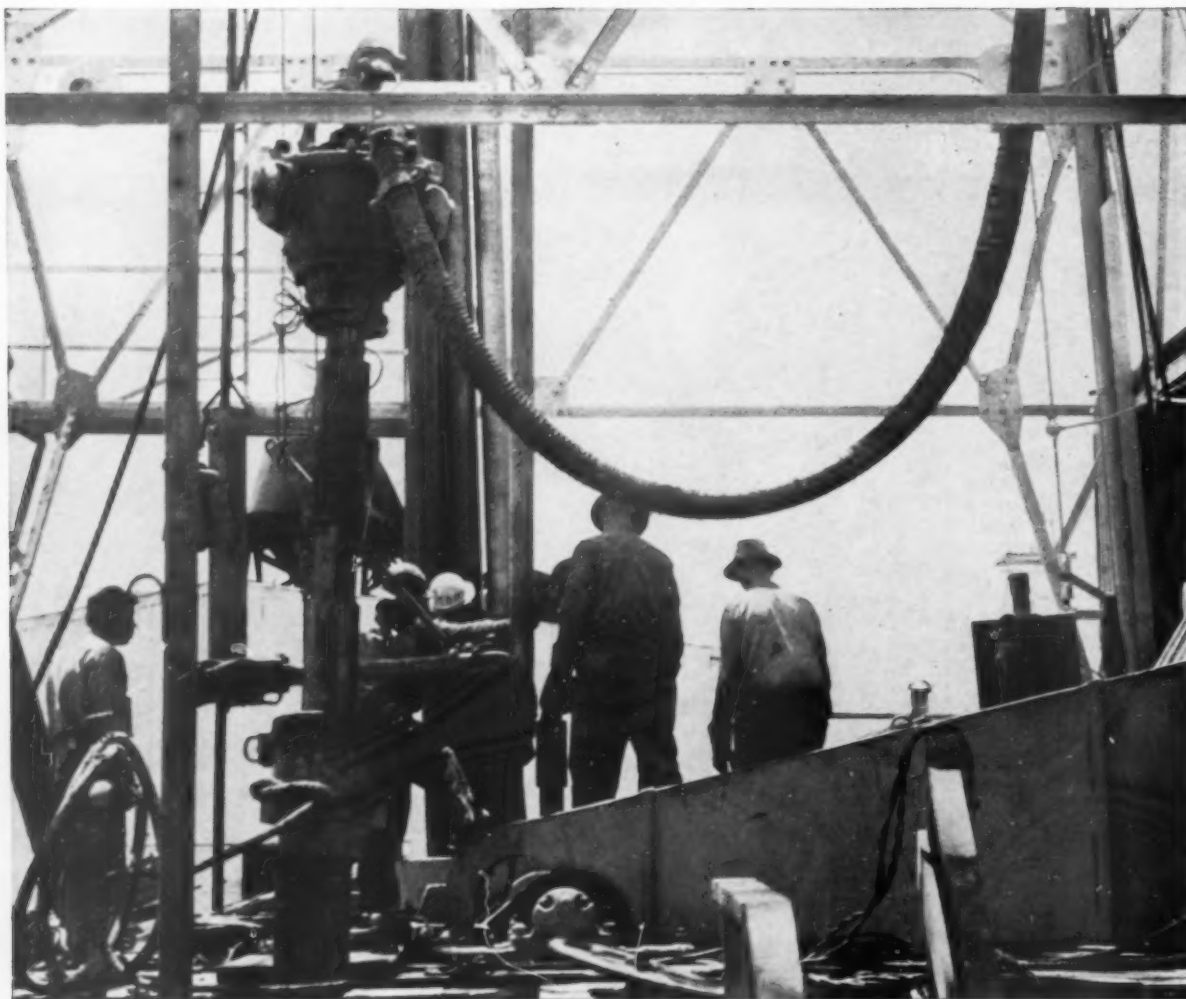
More than 1,000 mine and quarry operators are enjoying similar satisfaction and economy with Timken-equipped cars.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN

TAPERED ROLLER BEARINGS



CAN THEY DRILL THROUGH TO 中國?

A typical example of Goodrich improvement in rubber

OIL WELL DRILLERS say that if wells get much deeper they'll find themselves "puncturing a hole through to China." 10,000 feet, 12,000 . . . new records are being reported constantly. Yet not many years ago 3,000 feet was the limit.

Rotary drilling was being perfected—literally boring a hole in the earth as though with a huge auger, and pumping mud under pressure in a steady stream into the hole, to lubricate the drilling and carry back to the surface the earth and rock from the drill. But, to sink holes deeper than 3,000 feet required more pressure behind the stream of lubricating mud than the 200 pounds then used, and there was

no hose sufficiently flexible and at the same time strong enough to carry more pressure without danger of bursting and killing the drillers.

Goodrich engineers went to work on the problem. They developed a hose made of rubber, fabric and wire which will stand a test pressure of 6,000 pounds, and with this new hose deep wells became practical, cost of securing oil went down, new oil fields were opened.

Goodrich engineers could never have made such a spectacular improvement in hose if it were not for the fact that they are constantly working on improvement in all types of mechanical rubber goods. By this constant re-

search new rubber compounds, new methods of manufacture are developed for even the most standard Goodrich products. The same skill which made high pressure drilling hose possible is applied to any problem you may have, to improve the value and reduce the cost of mechanical rubber goods in your operation. Your Goodrich Distributor can help you take advantage of these improvements. The B. F. Goodrich Company, Mechanical Rubber Goods Div., Akron, Ohio.

Goodrich
ALL products *problem* IN RUBBER

STREAMLINING reduces

EXTERNAL resistance

BUY ACCO QUALITY

**A FEW OF THE 137
AMERICAN CHAIN & CABLE
INDUSTRIAL PRODUCTS**

AMERICAN CHAIN DIVISION
(DOMINION CHAIN COMPANY, Ltd., in Canada)
Weed Tire Chains • Welded and Weldless
Chain • Malleable Castings • Railroad
Specialties

AMERICAN CABLE DIVISION
Tru-Lay Preformed Wire Rope • Tru-Loc Proc-
essed Fittings • Crescent Brand Wire Rope
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ANDREW C. CAMPBELL DIVISION
Abrasive Cutting Machines • Floformers
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FORD CHAIN BLOCK DIVISION
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HIGHLAND IRON & STEEL DIVISION
Wrought Iron Bars and Shapes

MANLEY MANUFACTURING DIVISION
Automotive Service Station Equipment

OWEN SILENT SPRING COMPANY, Inc.
Owen Cushion and Mattress Spring Centers

PAGE STEEL AND WIRE DIVISION
Page Fence • Wire and Rod Products
Traffic Tape • Welding Wire

READING-PRATT & CADY DIVISION
Valves • Electric Steel Fittings

READING STEEL CASTING DIVISION
Electric Steel Castings, Rough or Machined

WRIGHT MANUFACTURING DIVISION
Chain Hoists • Electric Hoists and Cranes

PREFORMING reduces
INTERNAL resistance...

● Streamlining tends to eliminate the power-consuming resistance of external forces against airplanes, automobiles or trains. Preforming tends to eliminate the life-shortening internal stresses from within wire rope.

Being free of internal stress TRU-LAY Preformed rope is easy to handle. It resists kinking, adapts itself readily to splicing and socketing. It requires no seizing when cut or broken. TRU-LAY Preformed resists rotating or twisting in sheave grooves, spools perfectly on the drum, resists whipping. For all these reasons TRU-LAY lasts longer—gives much greater dollar value.

**AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE COMPANY, Inc.**
WILKES-BARRE, PENNSYLVANIA

District Offices: Atlanta, Chicago, Detroit, Denver,
Los Angeles, New York, Philadelphia, Pittsburgh,
Houston, San Francisco



In Business for Your Safety



TRU-LAY *Preformed* **WIRE ROPE**

ALL AMERICAN CABLE DIVISION ROPES MADE OF IMPROVED FLOW STEEL ARE IDENTIFIED BY THE EMERALD STRAND

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Speed • Stamina • Mobility

On its all-welded base, large-diameter turntable, strong material handling, the modern, powerful Bucyrus-Erie 120-B makes many a short cut in operations possible. It climbs still grades, makes sharp or gradual turns. Digging in or out of a bank is a simple matter.

With today's full particulars on the 120-B.



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ERIE**

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EQUIPMENT... SOUTH MILWAUKEE, WISCONSIN, U.S.A.